Naval Submarine Medical Research Laboratory

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USER'S MANUAL

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NAVAL SUBMARINE MEDICAL RESEARCH LABORATORY

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Approved and Released by

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Summary Page

PROBLEM:

To provide a user's manual for the computer assisted dental pain program.

FINDINGS:

The manual contains introductory information, a description of equipment needed, an overview of the different parts of the system, a list of definitions, a list of the treatment protocols, and a tutorial.

APPLICATION:

This manual serves as a user's manual, enabling a corpsman unfamiliar with computers to use the dental pain program without the need for supplementary training.

ADMINISTRATIVE INFORMATION

This investigation was conducted under Naval Medical Research and Development Command Research Work Unit MM33C30.002-5044. It was submitted for review on 18 May 1989 and approved for publication on 28 July 1989. It has been designated as Naval Submarine Medical Research Laboratory Report No. 1143.

ABSTRACT

This user's manual is designed to accompany the dental pain program implemented on MS-DOS computers. The manual contains introductory information, a description of equipment needed, an overview of the different parts of the system, a list of definitions, a list of the treatment protocols, and a tutorial.

1. INTRODUCTION

1.1 Historical Perspective

On board the submarine, you, the independent duty corpsman are responsible for the diagnosis and treatment of patients who present with serious illness during the patrol. In most cases, patients can be managed safely aboard the submarine. However, for some illnesses it is your responsibility to recommend evacuation of the patient to shore based facilities. A system that provides medical diagnostic information for corpsmen (MEDIC) has been developed to assist you in the diagnosis, triage, and management of patients who present during the patrol. When completed, the system will consist of programs for acute abdominal pain, acute chest pain, dental complaints, psychiatric disorders, and trauma. Each program will provide you with diagnostic and treatment suggestions based on the signs and symptoms entered into the computer. The purpose of the system is to assist you in providing quality care aboard the submarine and to decrease the number of inappropriate medical evacuations.

This manual reports on the computer assisted diagnostic and treatment program for the managment of acute dental pain. The dental pain program is designed for use with trauma and non-trauma related dental pain and for the differential diagnosis of soft tissue lesions.

1.2 Theoretical Basis of the Program

The dental program was initially developed at the Great Lakes Dental Research Institute, Great Lakes Illinois. The program was adapted to MS-DOS format and implemented on an IBM-PC/AT computer by the Naval Submarine Medical Research Laboratory, Groton, Connecticut. The program provides diagnostic assistance for patients who present with trauma and non-trauma related dental pain, for which it considers 35 dental conditions. It also provides textbook type assistance in the differential diagnosis of 49 soft tissue lesions.

In addition to diagnostic advice, the program provides treatment recommendations for each of the 35 conditions considered by the main program. The treatment advice was written by a Navy dental officer and considers the procedures and medications available aboard the submarine.

To use the program, you must first classify the patient's presenting dental complaint into one of 10 major categories. There is a category for soft tissue lesions and another for trauma related dental pain. There are 8 categories of non-trauma related dental pain. These are: These are: 1) Tooth Specific; 2) Teeth, Generalized/Multiple; 3) Gingiva, Specific Area; 4) Gingiva, Generalized; 5) Oral Mucosa, Tooth Associated; 6) Temporomandibular Joint/Muscle; 7) Dental Extraction Site; and 8) Tissue Swelling.

It is important to classify the patient's dental pain into the most appropriate category because the selection of the pathway determines which questions the program asks and which dental conditions it considers in it's

diagnosis. Selecting the wrong pathway may result in an inappropriate or incorrect diagnosis.

The patient's dental findings are entered by responding to questions asked by the diagnostic program. Questions address the history of the pain and findings from a routine dental exam. After entering the patient's dental findings, the program compares the findings against a set of diagnostic rules and generates a list of potential diagnoses. These diagnoses are classified into probable and possible.

You must rely on your clinical judgement and expertise both in deciding when to use the program and in interpreting its results. Remember that the computer does not have the capability to think or make the subjective evaluations which are so important in the diagnosis of dental pain.

1.3 Purpose of the Manual

The purpose of this manual is to train you in the use of the computer assisted dental pain program. Use of the dental diagnostic program is predicated on training for duty as an independent duty technician and mastery of the knowledge and skills required to take a history and conduct an examination for the indicants used by the program. The manual is written for the person with little or no prior experience with computers. After reading the manual, the user should be able to use the program without the need for supplementary training.

The manual is divided into five sections. Section 1 describes the history and theoretical basis of the computer assisted dental pain program. Section 2 lists hardware and software requirements, disk contents, how to load and start the program, and important keys. Section 3 discusses the dental conditions diagnosed by the program, when to use the program, and definitions of dental terms and conditions. Section 4 describes actual use of the dental pain program. Section 5 provides a step by step tutorial, which takes you through a simulated case from loading the program to reviewing the treatment protocol.

There are three appendices. A description of the dental conditions considered by the main diagnostic program is contained in Appendix A; definitions of dental terminology are in Appendix B; and treatment recommedations are contained in Appendix C. It is important to read through the entire manual and to be familiar with the use of the dental pain program before using it clincally.

2. GETTING STARTED

2.1 Equipment Needed

To use the dental pain program you need a computer and operating system with the following characteristics:

2.1.1 The Computer

The dental pain program will run on a computer which is compatible with a IBM PC/XT or later generation computer. The program will run on a Zenith 148 or a Zenith 248 computer.

The operating system for the computer must be MS-DOS version 3.0 or higher, or a comparable version of PC-DOS.

2.1.2 Graphics and Color Requirements

The dental pain program does not require graphics capability.

The program is written for both monochrome and color monitors. Use of a color monitor permits the use of different colors to display information. Information is displayed with different shades of gray on a monochrome monitor.

2.1.3 Memory Requirements

Memory requirements refer to the amount of computer memory needed to use the dental pain program. The program will run on a computer with at least 512 kilobytes of random access memory (RAM). We have not determined the smallest memory needed to run the program.

2.1.4 Storage Requirements

Storage requirements refer to the amount of space required to store the computer on the hard drive or floppy disk. The program requires 360 kilobytes of space.

2.1.5 The Printer

The use of a printer is optional. However, a printer is useful for making printed copies of information displayed on the CRT (computer screen). You can obtain printed copies of the information displayed on the computer screen by pressing the Shift and PrtSc keys at the same time.

In order to print the borders displayed on the computer screen, the printer should be compatible with the IBM ASCII graphics character set. If the printer is not compatible, the written text will be printed, but the borders will look funny.

2.2 Disk Contents

You will be supplied with at least one floppy disk copy of the dental pain program. This is your original disk. After installing the dental pain program on your computer, place the original disk in a safe location. Do not touch the original disk unless the working copy of the program becomes damaged.

2.3 Installing the Dental Program

Follow the four steps listed below to install the dental pain program.

1. Insert the orignal disk into the external disk drive. Type "INSTALL" and press the return/enter key. The program will ask a number of questions. Your responses will tell the computer where to install the program. The program will ask:

2. **"Install dental program on hard drive (H) or floppy disk (F) ?"**

Enter the letter 'H' for the hard drive or the letter 'F' for the floppy disk. Entry of any other character will cause the program to beep and request new information.

3. **"Enter the letter key associated with the _____ drive ?"**

The program asks for the letter key associated with the drive specified in the previous question. In most cases, the hard drive is called 'C' and the floppy drive is called 'A'. Some computers use other letters to identify these drives.

4. **"Enter the name of sub-directory ?"**

The sub-directory is the location on the drive or floppy disk where the dental program will be stored. We suggest that you call the sub-directory 'DENTAL'.

After answering these questions, installation of the program begins.

2.3.1 Installation on Hard Drive

To install the dental pain program on the hard drive, enter 'H' for hard drive and specify a sub-directory. When installation is complete, the program will display the statement "INSTALLATION COMPLETE". The working copy of the dental pain program is now installed on your hard drive.

2.3.2 Starting the Program from a Hard Drive

Turn the computer on. The program will "boot" up in the usual manner and display the MS-DOS prompt. The prompt is usually the symbol 'C>' followed by a blinking cursor. Enter 'DENTAL' and press the return/enter key. The program will start.

2.3.3 . Installation on Floppy Disk

Based on your answers to the computer's questions, you want to install the dental program on a floppy disk. The dental pain program will load into memory and then ask you to insert a formatted floppy disk into the external disk drive. Consult the computer user's manual to obtain instructions for formatting floppy disks. The dental pain program will be installed on the floppy disk in the specified sub-directory. When installation is complete, the program will display the statement "INSTALLATION COMPLETE". The working copy of the dental pain program is now installed on a floppy disk.

2.3.4 Starting the Program from a Floppy Disk

Turn the computer on. The computer will "boot" up in the usual manner and then display a prompt. The prompt is usually the symbol 'C>' followed by a blinking cursor. Enter the letter key associated with your floppy disk drive and then press the return/enter key. Insert the floppy disk containing the dental pain program. Enter 'DENTAL' and press the return/enter key. The program will start.

2.4 Disk Backup

If a disk surface is damaged, the information on the damaged portion of the disk may be lost. This damage can result from poor disk quality, disk age, heavy use, electrical "glitches" in the power supply, or other events that subject a disk to strong physical or electromagnetic forces. You may also lose data or programs through operator error. Proper backups ensure that if a program or data is lost, you can quickly have the program running again.

If your disk becomes damaged, the dental pain program will be lost. The program can be loaded again by following the directions given Section 2.3 - Installing the Dental Pain Program.

If your disk becomes damaged you will also lose all the real case data that has been entered into the program. For this reason, you should routinely make a backup of your real case data.

2.5 How to Make a Backup

To make a backup, you must first format a blank floppy disk. To format a blank disk, follow the commands in the user's manual to your computer. Once the disk is formatted, label it 'Dental Pain Real Case Data - Backup'. You should only format a disk once. After the disk is formatted do not format it again. When you make a backup on subsequent occassions, don't format the disk. If you do so, you will loose all the information on the disk.

To make a backup, enter the command 'DENCOPY'. The program will ask you to insert your backup disk into the external disk drvie. The computer will copy the symptom data for real dental cases onto the backup disk. The statement 'COPY COMPLETE' will be displayed when the backup is done. Store

the backup disk in a safe location.

2.6 When to Make a Backup

You should make frequent backups. While it is not necessary to make a backup every time you use the dental pain program, a back up should be made on a routine basis to avoid losing data.

2.7 Important Keys

To use the program effectively, you need to become familiar with several keys that are often used. The names of keys available for use are usually listed at the bottom of the display screen. The following is a short description of the use and possible locations for certain commonly used keys. If you cannot find the keys, consult your computer user's manual for their location.

2.7.1 Arrow Keys

The arrow keys are usually found on the numeric keypad at the right of the keyboard. To use these keys, you must first ensure that the numeric keypad lock (NumLock) is not engaged. The NumLock key toggles back and forth from using the keypad for the arrow and other special keys to using the keypad for entering numbers. Some computers do not have a numeric keypad. If this is the case, then consult your computer user's manual for information on the locations and labels of special keys.

2.7.2 Escape Key

The escape key is usually labeled 'Esc'. In this program the escape key is used to exit from routines to display definitions of dental terms or conditions and to exit from the corpsman's diagnosis page to the computer generated diagnosis page.

2.7.3 Function Keys

Special function keys are ususally located to the left of the main keyboard and are denoted by the letter 'F'. On some computers, the function keys are made from a combination of other keys. If this is the case, consult the computer user's manual to find out the location of function keys. The dental pain program uses three function keys. They are:

Function key 7: Used to access defintions of dental terminology from within the diagnostic program.

Function key 9: Used to exit from within the program to the main menu.

Function key 10: Used to exit from within the program to the previous sub-menu.

2.7.4 Number Keys

Number keys are usually located on the top row of the main keyboard. The numeric keypad is also available for numeric use when the keypad lock (NumLock) is set. In the dental pain program, responses can be entered by pressing the number key associated with the desired response.

2.7.5 Page Up and Page Down Keys

The page up and page down keys are usually labeled PgUp (Page Up) and PgDn (Page Down). In the dental pain program, they are used to proceed to-and-from successive display pages.

2.7.6 Return/Enter Key

This is actually one key. On some computers it is labeled as "Return" and on others as "Enter". It is usually a large key just to the right of the conventional typewriter keyboard. This key is used to tell the computer that you are through typing and that the computer is to take the information just typed and use it in the program.

2.7.7 Shift PrtSc Key

The Shift PrtSc key is composed of two keys, the Shift key and the PrtSc key. The user presses these two keys at the same time to obtain a printed copy of information displayed on the computer screen.

3. GENERAL ASPECTS OF THE DENTAL PAIN DECISION SUPPORT PROGRAM

3.1 Dental Conditions Diagnosed by the Program

The dental pain program is intended to aid you in the diagnosis and treatment of trauma and non-trauma related dental pain and in the differential diagnosis of soft tissue lesions.

The program considers thirty-five dental conditions in its diagnosis of trauma and non-trauma related dental pain. These conditions are listed alphabetically in Table 1. Note that many of the diagnoses are not mutually exclusive and may be present simultaneously. Some of the diagnoses are quite evident on examination, but were included to provide you with confirmation of your own diagnosis and rapid access to related treatment information. The program also provides textbook style assistance in the differential diagnosis of forty-nine soft tissue lesions. These are listed in Table 2. A discussion of the dental conditions considered by the main diagnostic program for trauma and non-trauma related dental pain is provided in Appendix A.

Table 1. Thirty-five dental conditions considered by the computer assisted program for the diagnosis of trauma and non-trauma related dental pain.

Abscess/infection/cellulitis
Acute apical abscess
Acute apical periodontitis
Acute herpteic gingivostomatitis
Acute gingivitis
Carious lesion (decay)
Dentin hypersensitivity
Defective restoration
Displace/mobility of tooth, favorable prognosis
Displace/mobility of tooth, unfavorable prognosis
Endo/perio combined problem
Enamel fracture
Food impaction
Fractured crown, small pulp exposure
Fractured crown, large pulp exposure
Fractured crown, pulp not exposed
Fractured alveolar bone
Fractured mandible
Fractured maxilla
Fractured facial bones
Irreversible pulpitis
Internal derangement of the TMJ
Localized alveolar osteitis
Maxillary sinusitis
Myofascial pain/muscle spasm
Necrotizing ulcerative gingivitis
Neurologic injury
Osseous sequestrum
Occlusal trauma
Periodontal abscess
Periocoronitis/erupting tooth
Reversible pulpitis
Root fracture
Total avulsion, good for replant
Total avulsion, poor for replant

Table 2. Forty-nine soft tissue lesions for hich the dental diagnosis program provides a differential diagnosis.

Desquammative lesions of gingiva
Atrophy or ulceration of gingiva
Localized hyperplastic, hemorrhagic lesions of gingiva
Generalized hyperplastic, hemorrhagic lesions of gingiva
Localized hyperplastic, non-hemorrhagic lesions of gingiva
Generalized hyperplastic, non-hemorrhagic lesions of gingiva
Cystic lesions of gingiva
Keratotic non-sloughing, non-ulcerated, non-eroded, non-papillary lesions
Keratotic non-sloughing, non-ulcerated, non-eroded, papillary lesions
Keratotic non-sloughing, ulcerated, eroded, non-papillary lesions
Keratotic non-sloughing, ulcerated, eroded, papillary lesions
sloughing, non-keratotic lesions
Single exophytic red lesions
Single non-exophytic red lesions
Generalized or multiple exophytic red lesions
Generalized or multiple non-exophytic red lesions
Single exophytic brown and/or black lesions
Single non-exophytic brown and/or black lesions
Generalized or multiple exophytic brown and/or black lesions
Generalized or multiple non-exophytic brown and/or black lesions
Single blue and/or purple lesions
Generalized or multiple blue and/or purple lesions
Single yellow lesions
Generalized or multiple yellow lesions
Acute vesicular lesions
Chronic vesicular lesions (pseudovesicles)
Acute bullous lesions
Chronic bullous lesions
Acute ulcers
Chronic ulcers
Small firm non-hemorrhagic lobulated lesions
Extensive firm non-hemorrhagic lobulated legions
Single firm non-hemorrhagic nodules
Multiple firm non-hemorrhagic nodules
Single bony lumps or nodules
Multiple or extensive bony enlargments or nodules
Macroglossia
Microglossia
Clefts
Fissured tongue
Supernumerary tongue
Smooth tongue
Glossodynia (pain in tongue)
Acute parotid-area swellings
Chronic parotid-area swellings
Acute discrete nodules, non-parotid area
Chronic discrete nodules, non-parotid area
Acute extensive diffuse swellings, non-parotid area
Chronic extensive diffuse swellings, non-parotid area

3.2 When to Use the Dental Pain Diagnostic Program

The computer assisted dental program is designed to assist you in the management of patients with dental pain. However, the computer lacks the ability to think. You must rely on your clinical judgment and expertise in deciding when to use the program, and in making a final diagnosis.

To use the dental pain program, you have to first classify the patient's presenting problem into one of ten diagnostic categories. To make the classification you should briefly question the patient about the problem. For example, what is the patient's chief complaint? Where is the problem located? What, if anything, caused the problem? How long has the problem lasted? A cursory examination should also be performed to provide additional information about the dental problem.

To classify the patient's dental complaint you must first determine if the dental complaint is trauma related or non-trauma related. In this program, trauma related refers to any dental or oral condition that is a direct result of a physical force. This includes biting forces and blows or injuries to the teeth or face. In most cases of trauma (e.g., alvused or fractured teeth), this should be obvious. Fractured, partially-avulsed, and totally-avulsed teeth should usually be evaluated with the option for trauma related dental pain. A key to proper evaluation is timing. A small chip or fracture on the tooth does not necessarily mean that the problem is trauma related. The chip or fracture could have happened years ago and be unrelated to the present complaint.

If the patient's problem is non-trauma related, you must decide if the problem is related to the teeth or gingiva, and if not to either of these, whether or not it is related to one of the other categories, such as extraction site or temporomandibular joint.

> **NOTE:** If the diagnoses generated by the computer seems inappropriate or if the program is unable to arrive at a diagnosis, you should review your initial classification of the patient's dental problem and try an alternate diagnostic pathway.

3.3 Definition of Dental Terminology

The accuracy of the dental pain program is dependent on the accuracy of the data collected by you. You are sufficiently trained to perform the examination procedures required by the dental program. Definitions of dental terminology can be accessed from within the program (see Sections 4.1.8 and 4.3.1). Definitions are presented in Appendix B for easy reference.

4. DENTAL PROGRAM MODULES

The computer-assisted dental pain program is divided into three primary modules: the diagnostic program for dental pain; the differential diagnosis program for soft tissue lesions; and other activities. Included in other activities are options to display definitions of dental terms and conditions and treatment recommendations. Each of the modules will be discussed in order.

4.1 Overview of the Diagnostic Program for Dental Pain

This module contains the diagnostic program for evaluation of trauma related and non-trauma related dental pain. To load the dental pain program, follow the directions given in Section 2.3 - Installing the Dental Pain Program.

4.1.1 Color Capability

The dental program is written for both monochrome and color monitors. Once the program has been loaded and the "DENTAL" command given, the program will ask you to specify color information. Enter "M" for monochrome and "C" for color.

4.1.2 The Title Page

The Title Page is displayed after you have specified color information (Figure 4-1). The Title Page contains the name of the diagnostic program, version number, and the address of the program developers. Please forward any problems or questions regarding the Dental Pain Diagnostic Program to the Naval Submarine Medical Research Laboratory, Box 900, Naval Submarine Base New London, Groton, CT. 06349- 5900.

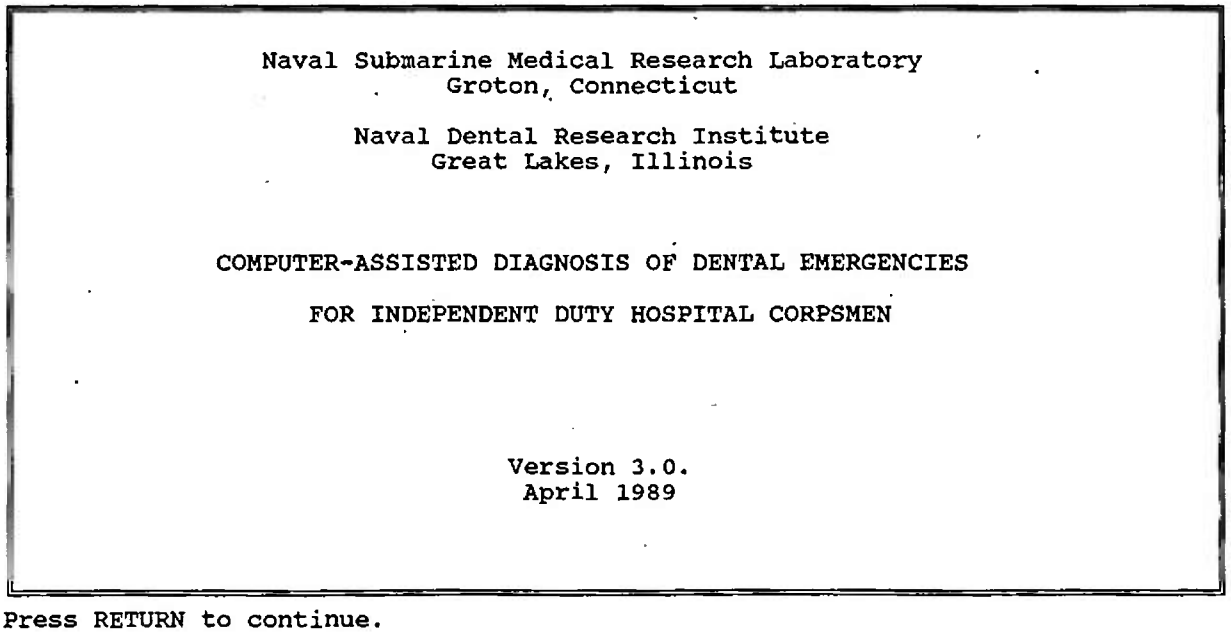


Figure 4-1 Title Page of the Dental Pain Diagnostic Program

Pressing "RETURN", takes the user to the instructions page.

4.1.3 Instructions Page

This page is displayed after the title page. The instructions page provides a very brief summary of the program. It includes a short description of the three dental modules, instructions regarding data entry, and instructions to produce a printed copy of information displayed on the computer monitor.

4.1.4 Real or Simulated Case Page

This page asks you to specify whether the case is real or simulated. The real case option is selected when the user wants to enter the symtpom findings and obtain a computer based diagnosis for an actual patient. Real cases are stored on the computer disk. The simulated case option should only be used for training purposes. It allows the user to "make-up" history and dental exam findings and to see how changes in symptom entries affect the computer diagnosis. Data from simulated cases are not stored on the computer disk.

4.1.5 SSN/Age Page

This page is displayed only for real cases. Enter the patient's Social Security Number and age. Entry of an invalid number will cause the program to "beep" and request new information.

4.1.6 Main Menu

The Main Menu Page provides the user with 7 program options. (Figure 4-2).

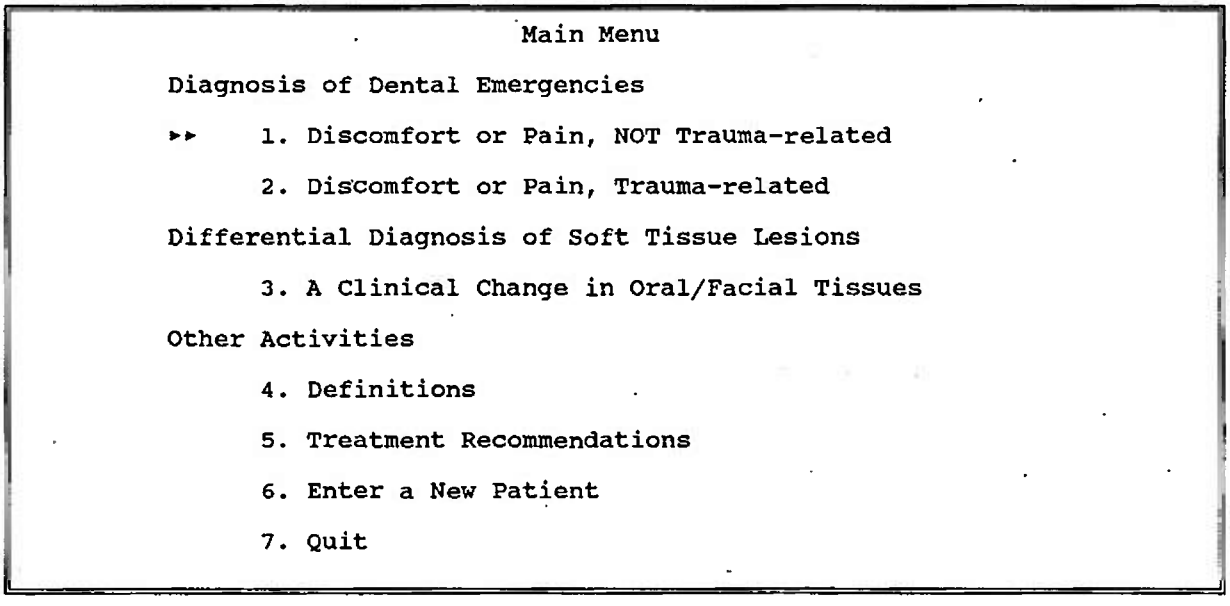


Figure 4-2 Main Menu of the Dental Program

4.1.6.1 Discomfort or Pain, Non-Trauma Related

This option is selected when you want to enter the signs and symptoms and obtain a computer-assisted diagnosis for a patient with dental pain that is non-trauma related.

4.1.6.2 Discomfort or Pain, Trauma Related

This option is selected when you want to enter the signs and symptoms and obtain a computer-assisted for a patient with dental pain that is trauma related.

The diagnosis of dental pain, either trauma or non-trauma related, comprises the first of three modules of the dental pain program.

4.1.6.3 A Clinical Change in Oral/Facial Tissues

Select this option to access the differential diagnosis of soft tissue lesions. Section 4.2 Overview of the Differential Diagnosis of Soft Tissue Lesions discusses this option in detail. The differential diagnosis of soft tissue lesions comprises the 2nd module of the dental pain program.

4.1.6.4 Definitions

Select this option to access definitions of dental terminology and conditions considered by the program. This option is part of the 3rd module of the dental pain program (see Section 4.3 - Other Activities).

4.1.6.5 Treatment Recommendations

Select this option to access treatment recommendations for dental conditions considered by the diagnostic program for trauma and non- trauma related dental pain. This option is part of the 3rd module of the dental pain program (see Section 4.3 - Other Activities).

4.1.6.6 Enter a New Patient

Select this option to enter dental findings for a new patient. This option is part of the 3rd module of the dental pain program (see Section 4.3 - Other Activities).

4.1.6.7 Quit

Select this option to exit the program and end your interaction with the computer. Use of the program should always end with selection of this option. Ending your interaction in any other way risks damage to, or loss of, the program.

4.1.7 Case Example

Suppose you want to enter a dental case. The patient has dental pain that is non-trauma related. Select the option for the diagnosis of

Discomfort or Pain, Non-Trauma Related. Options are selected by either pressing the number key associated with the option, or by using the arrow keys to move the pointer to the desired option and then pressing the return/enter key. Once this option is selected the program proceeds to a sub-menu: "Dental Pain Menu, Non-Trauma Related" (see Figure 4-3). You must classify the patient's presenting dental problem into the most appropriate category. These are: Tooth, Specific; Teeth, Generalized or Multiple; Gingiva, Specific Area; Gingiva, Generalized; Oral Mucosa, Tooth-associated; Other Oral Soft Tissues; Temporomandibular Joint/Muscles; Dental Extraction Site; or Tissue Swelling. Using the arrow keys, move the pointer to the most appropriate classification and then push the return/enter key.

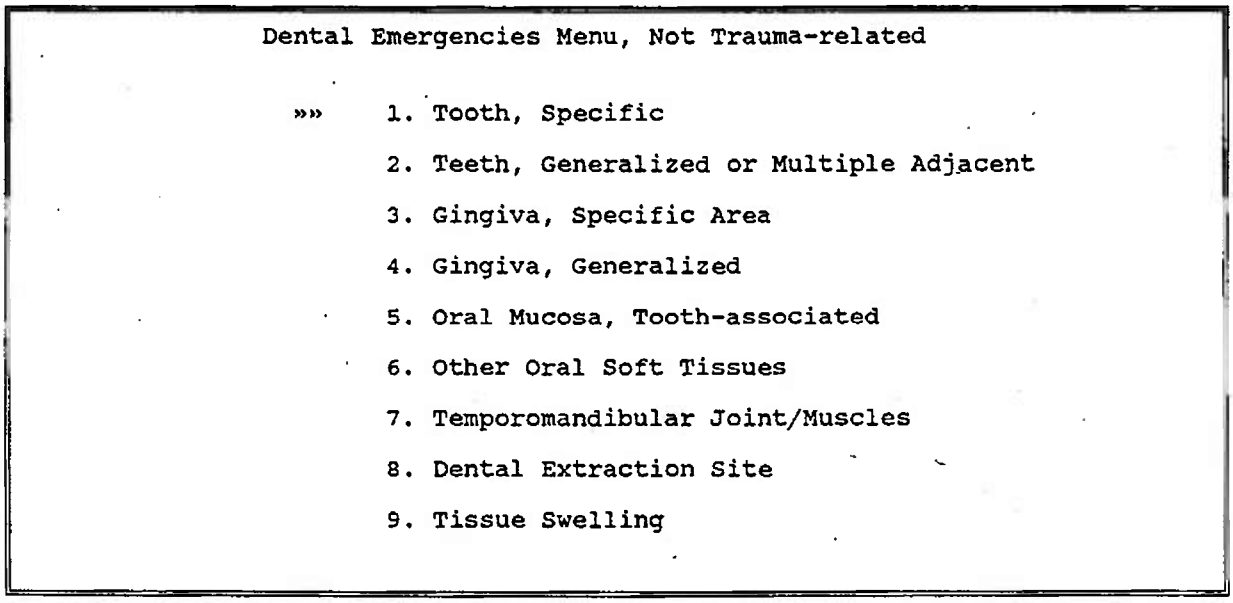


Figure 4-3 Menu for Non-Trauma Related Dental Pain

4.1.8 Data Entry

The patient's dental findings are entered into the program by responding to a set of questions. The questions guide the history and physical examination. Some of the questions require you to enter information from the patient's dental record, and some require you to examine the patient's mouth.

The questions asked by the program depend on your inital classification of the dental problem and subsequent dental findings. The computer program asks only those questions required to make a diagnosis. Each question is displayed on a separate page and you must respond to each

question. An example of a dental question is shown in Figure 4-4. The program will ask questions until it has collected enough information about the patient to make a diagnosis, or until it determines that it cannot reach a diagnosis based on the information entered.

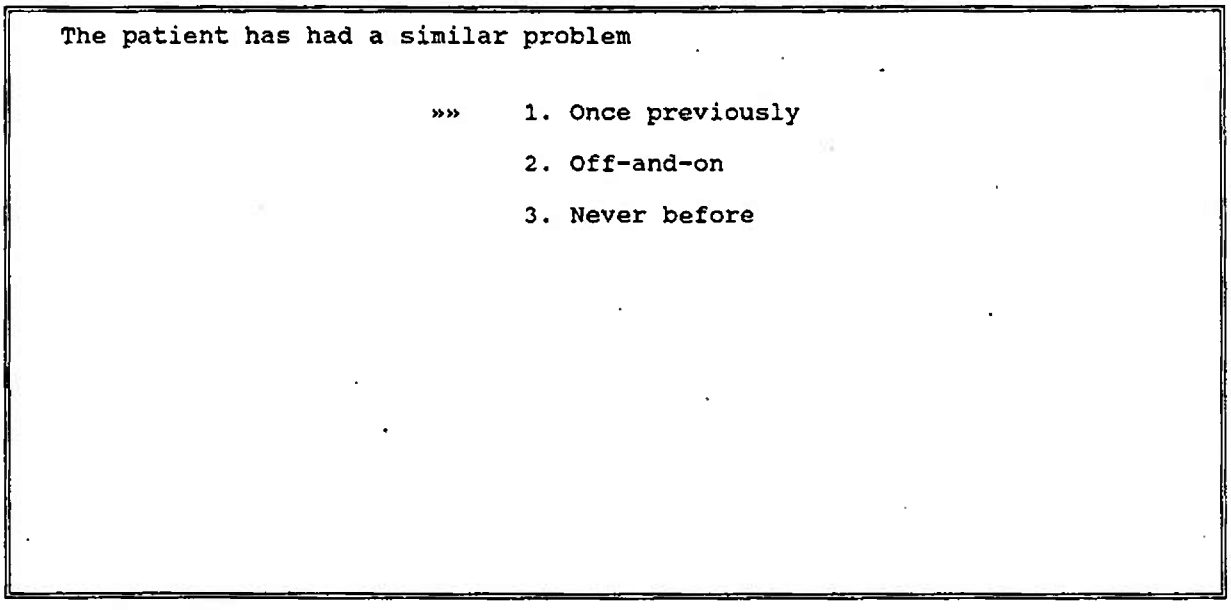


Figure 4-4 An Example of a Dental Question

Entering Dental Findings: Dental findings are entered by responding to questions. There are two ways to enter a finding:

1. Use the arrow keys to move the pointer to the desired response and then push the return/enter key.

2. Push the number key associated with the desired response.

The program highlights the desired response and proceeds to the next question.

Returning to Previous Questions: It is not possible to return to previous questions in the present version of the dental pain decision support program.

Correcting Errors: In the present version of the dental program, errors in data entry can only be corrected by returning to the previous menu and re-entering all of the patient's symptom findings.

Returning to Previous Menus: You can return to previous menus by use of the function keys. Function key 9 (F9) will return you to the main menu, and function key 10 (F10) will return you to a sub-menu. However, when you return to a previous menu, the dental findings you have already entered are deleted from memory and you will have to enter the findings for the patient from the start. The available function keys and their use are listed at the bottom of the computer screen.

Definition of Dental Terms: The definition of dental terminology can be obtained from the main menu (see Section 4.3.1) or from within the diagnostic program. To obtain a definition from within the program the user presses Function key 7 (F7). The user enters a letter(s) or word and the program displays the definitions of all dental terms that match the entry. Pressing the page up key (PgUp) or the page down key (PgDn) takes the user to the previous or next page of definitions. The number of pages of definitions is displayed in the lower right corner. Pressing the escape key will return the user to the diagnostic program. The available function keys and their use are listed at the bottom of the computer screen.

4.1.9 Corpsman's Diagnosis Page

The Corpsman's Diagnosis Page (Figure 4-5) lists on two pages the conditions considered by the main program for the diagnosis of trauma and non-trauma related dental pain. The program does not ask you to make a diagnosis for the differential diagnosis of soft tissue lesions.

The program asks you to select the most likely diagnosis(es) for the patient. To make your selection(s), use the up and down arrow keys to move the pointer to the desired dental condition and then press the return/enter key. If your diagnosis is other than one considered by the program, select "Other". The program will ask you to enter the name of the other diagnosis. If you make a mistake in selecting a diagnosis(es) for the patient, you can remove the selection by re-entering it. Use the up and down arrow keys to move the pointer to the diagnosis entered in error and then press the return/enter key.

Use the page up (PgUp) and page down (PgDn) keys to move between the first and second pages of dental diagnoses. Use the escape key (Esc) to exit the corpsman's diagnosis page and proceed to the computer generated diagnosis(es).

Corpsman's Diagnosis

Select the Most Likely Diagnosis(es)

»» • Localized Alveolar Osteitis (Dry Socket)
• Osseous Sequestrum
• Abscess/Infection/Cellulitis
• Periodontal Abscess
• Reversible Pulpitis
• Irreversible Pulpitis
• Acute Apical Abscess
• Acute Apical Periodontitis
• Carious Lesion (Decay)
• Dentin Hypersensitivity
• Maxillary Sinusitis
• Endodontic/Periodontic Combined Problem
• Defective Restoration
• Acute Herpetic Gingivostomatitis
• Pericoronitis/Erupting Tooth
• Necrotizing Ulcerative Gingivitis
• Acute Gingivitis
• Food Impaction (Page 1 of 2)

Figure 4-5 Corspman's Diagnosis Page

4.1.10 Computer Generated Diagnosis Page

The computer generated diagnosis page (see Figure 4-6) lists the diagnosis(es) made by the program based on the dental findings entered by the user for the patient. Sometimes, the program cannot arrive at a diagnosis based on the dental findings. In these cases, the program makes a statement to this effect. In most instances, the dental program arrives at a list of probable and possible diagnoses.

Probable Diagnoses	Possible Diagnoses
»» • Acute Gingivitis	• Pericoronitis/Erupting Tooth • Necrotizing Ulcerative Gingivitis

For Treatment Recommendations, position »» then press RETURN.

F9 - Main Menu F10 - Sub-menu F7 - Definitions

Figure 4-6 Computer Generated Dental Diagnostic Page

To access a treatment recommendation for a diagnosis made by the dental program, move the pointer to the desired diagnosis and then press the return/enter key. Use the left and right arrow keys to move the pointer between the list of probable and possible dental diagnoses. Use the up and down arrow keys to move the pointer within the list of either probable or possible diagnoses.

4.1.11 Treatment Recommendations Page

The treatment recommendations page provides treatment recommendations for the dental conditions considered by the trauma and non-trauma related diagnostic module. Treatment recommendations were written by a Navy dental officer. They take into consideration the medications available for use on board the submarine. Other Navy approved references should be used to supplement these recommendatons when indicated. Figure 4-7 displays the treatment recommendation made by the program for Pericoronitis/Erupting Tooth.

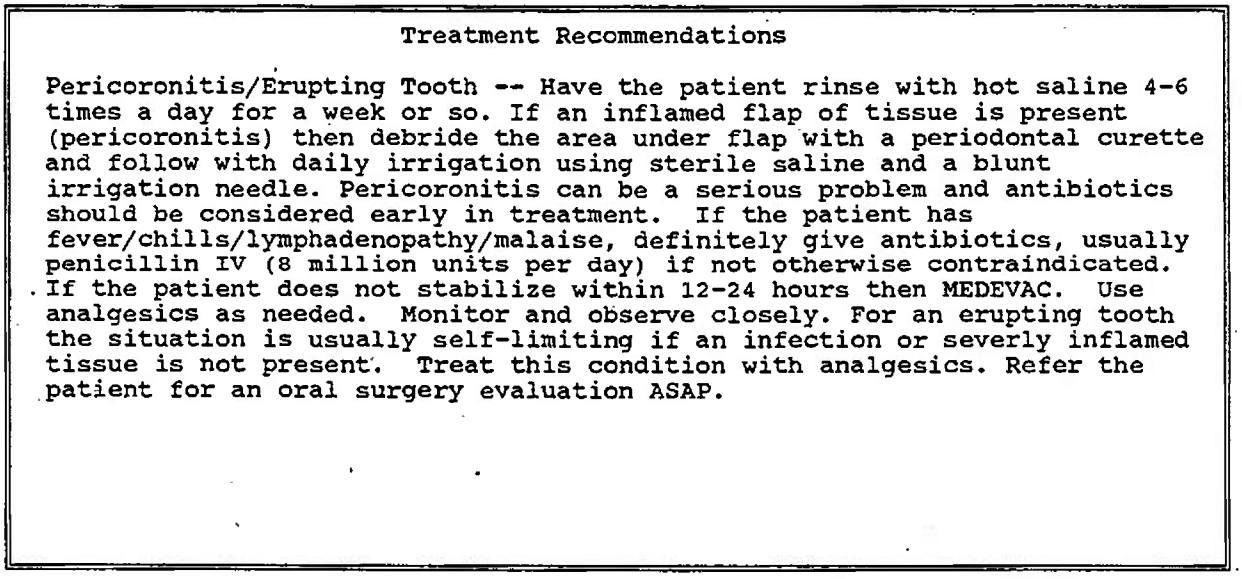


Figure 4-7 Treatment Recommendation Made by the Program for Pericoronitis/Erupting Tooth

To obtain a printed copy of a treatment recommendation, press the Shift and PrtSc keys at the same time. To return to the Computer Generated Diagnosis Page press the return/enter key.

4.2 Overview of the Differential Diagnosis of Soft Tissue Lesions

The computer based dental diagnostic system provides a module for the differential diagnoses of soft tissue lesions. This module provides textbook style assistance about 49 soft tissue lesions. It does not provide treatment recommendations. After entering the patient's symptom findings, the program generates a list of differential diagnoses. Diagnoses which are starred indicate a possible life- or mission-threatening situation.

4.2.1 A Clinical Change in Oral/Facial Tissues

To access the module for the differential diagnosis of soft tissue lesions select the option on the main menu - "A Clinical Change in Oral/Facial Tissues". You are then taken to the instructions page.

4.2.2 Instructions Page

The instructions page contains a brief description of the module for the differential diagnosis of soft tissue lesions. After reading the instructions, press the return/enter key to proceed to the Soft Tissue Lesions Menu.

4.2.3 Soft Tissue Lesions Menu

This menu contains seven options (Figure 4-8).

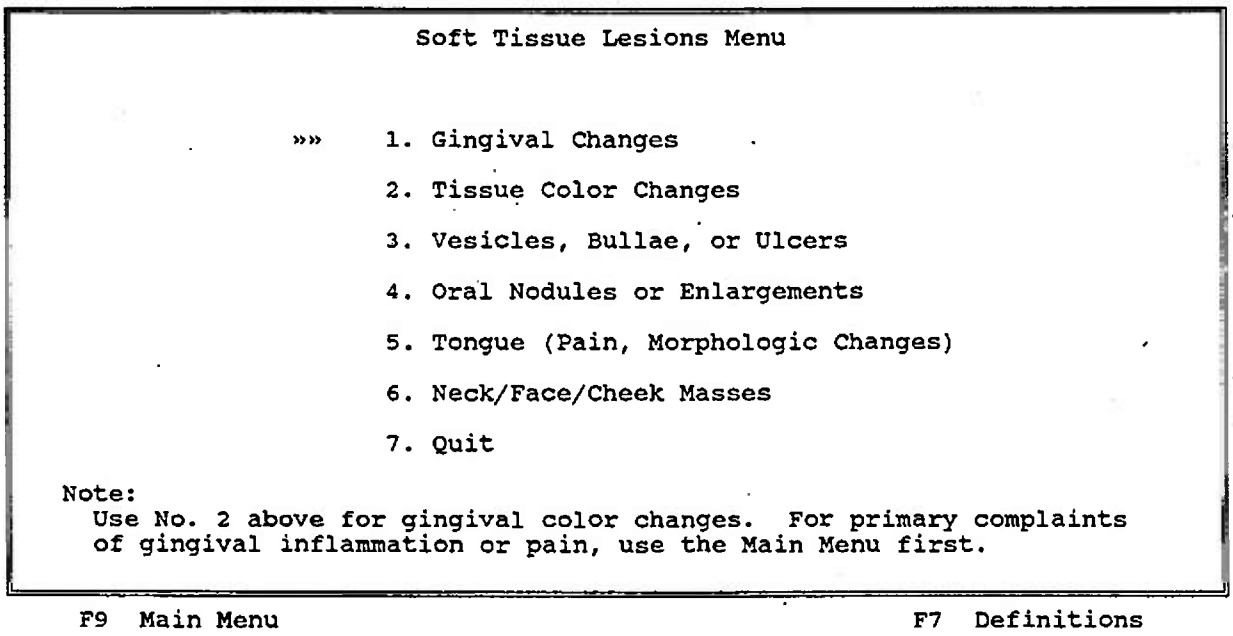


Figure 4-8 Soft Tissue Lesions Menu

Select the category that best corresponds to the primary area of concern. To make a selection, enter the number associated with the desired option, or use the up and down arrow keys to move the pointer to the desired option and press the return/enter key.

Select 'Quit', if you want to exit the dental diagnostic program and end your interaction with the computer.

4.2.4 Data Entry

After you have selected a primary area of concern, the program asks a number of questions concerning the color, nature and description of the lesion. Data entry for the differential diagnosis of soft tissue lesions is the same as for the main diagnostic program for trauma and non-trauma related dental pain (Section 4.1.8 - Data Entry).

4.2.5 Differential Diagnosis

Based on the symptom findings, the program generates a differential diagnosis list. Diagnoses which are starred indicate a possible life- or mission- threatening condition. Figure 4-9 shows the differential diagnosis list for Desquamative Lesions of Gingiva.

The current version of the module for the differential diagnosis of soft tissue lesions does not provide treatment recommendations. It is meant to provide you with textbook style assistance in the diagnosis of soft tissue lesions.

Function keys and their use are listed at the bottom of the display screen. To obtain a printed copy of the differential diagnosis, list press the Shift and PrtSc keys simultaneously. Sometimes, the display of a large number of differential diagnoses will require more than one screen. Use the PgDn (page down) and PgUp (page up) keys to proceed to previous and next pages. Function key 9 (F9) returns you to the main menu (Section 4.1.6), function key 10 (F10) returns you to the soft tissue lesion menu (4.2.2), and function key 7 (F7) accesses definitions of dental terminology.

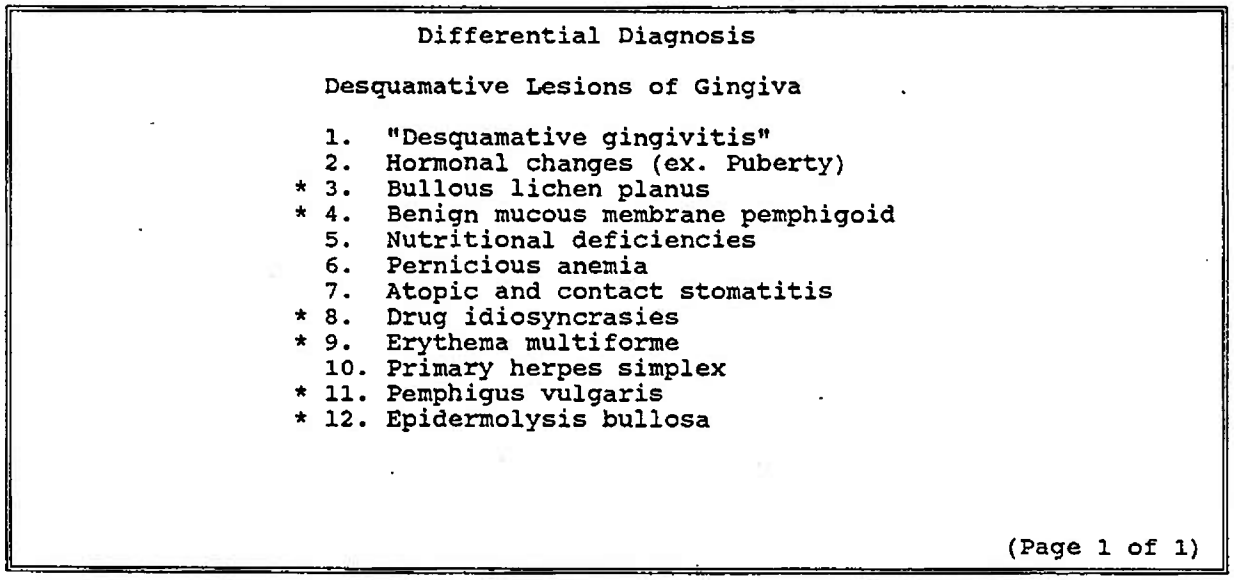


Figure 4-9 Differential Diagnosis List for Desquamative Lesions of Gingiva

4.3 Overview of Other Activities

The third module of the dental pain program is called Other Activities. This module includes options for direct access to definitions of dental terms and conditions; direct access to treatment recommendations; entering new patient information; and ending your interaction with the computer. The options provided in this module are accessed from the main menu (see Section 4.1.6 - Main Menu).

4.3.1 Definitions

Select this option to access definitions of dental terminology and conditions considered by the diagnostic program for trauma and non- trauma related dental pain. Selecting this option takes you to a definitions menu.

4.3.1.1 Definitions Menu

The definitions menu provides you with two options. The options are: definitions of diseases and definitions of terms. The avaliable function

keys are displayed at the bottom of the screen. Press function key 9 (F9) to return to the main menu.

4.3.1.2 Definitions of Diseases

Select this option to access definitions for the 35 dental conditions considered by the diagnostic program for trauma and non-trauma related dental pain. Selecting this option takes you to pages for Disease Definition Selection. Appendix A provides a printed copy of each disease definition for easy reference.

4.3.1.3 Disease Definitions Selection Pages

Thirty-five dental conditions are listed on two display screens (Figure 4-10). Use the arrow keys to select the dental condition for which a definition is desired. The definition for the selected dental condition is displayed in a window on the page. Use the page up (PgUp) and page down (PgDn) keys to proceed between display pages. Use the escape key (Esc) to return to the previous menu.

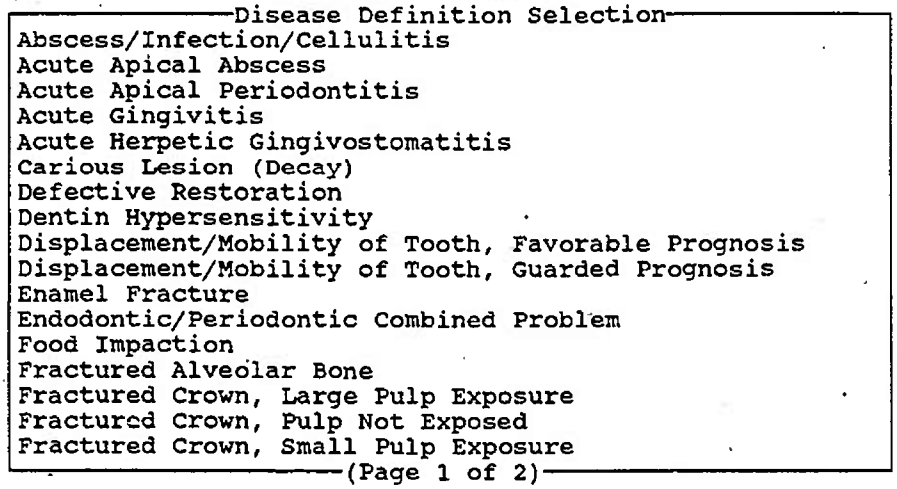


Figure 4-10 Page for Disease Definition Selection

4.3.1.4 Definitions of Terms

Select this option from the Definitions Menu (see Section 4.3.1.1) to obtain a definition for one of 77 dental terms. Selecting this option takes you to two Definition Selection Pages (Figure 4-11). Appendix B provides a printed copy of each dental term for easy reference.

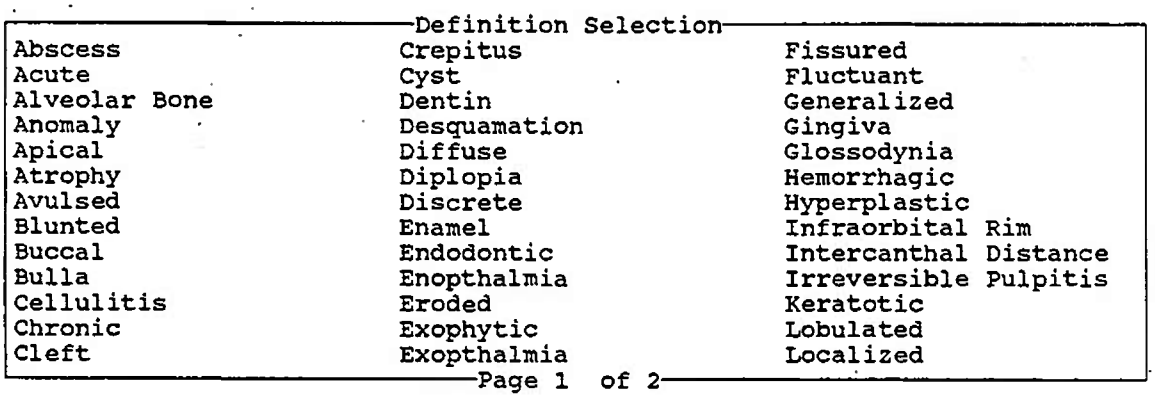


Figure 4-11 Definition Selection Page for Dental Terms

4.3.1.5 Definition Selection Pages

Definition Selection Pages list 77 dental terms for which definitions are available. Use the arrow keys to select the term for which a definition is desired. Press the return/enter key to access the definition. The definition is displayed in a window. Figure 4-12 shows the definition for dental term Enophthalamia. Use the page keys to proceed between display pages and the escape key (Esc) to return to previous menus.

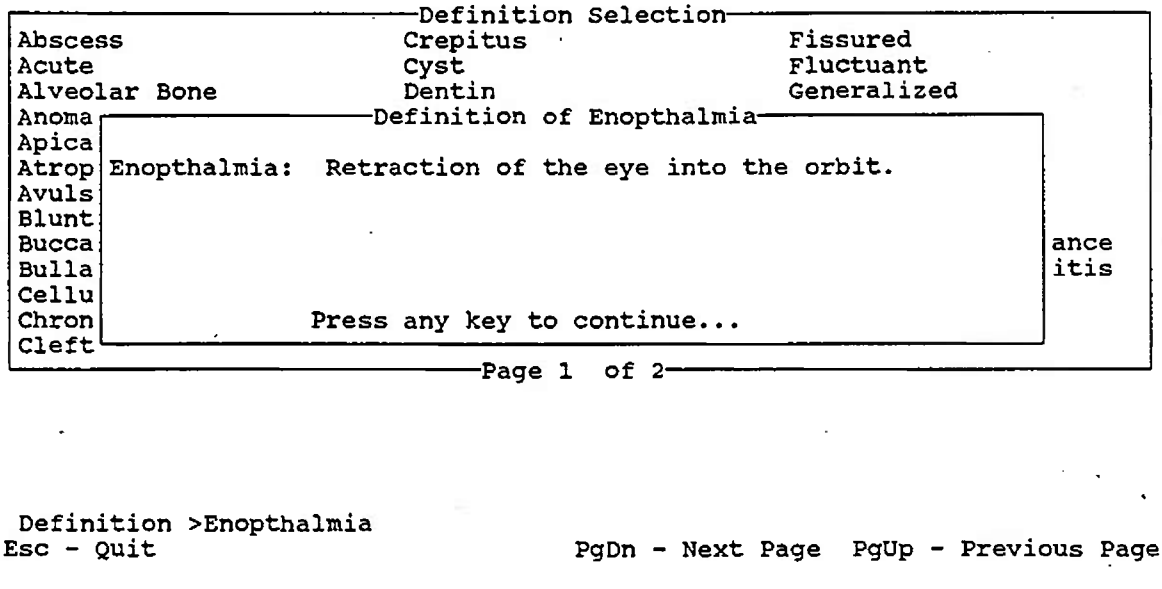


Figure 4-12 Definition of the Dental Term Enopthalmia

4.3.2 Treatment Recommendations

Select this option from the main menu to access treatment recommendations for the thirty-five dental conditions considered by the diagnostic program for trauma and non-trauma related dental pain. Treatment recommendations are provided in Appendix C for easy reference.

4.3.3 Enter a New Patient

Select this option to enter dental findings for a new patient. Selecting this option clears the memory.

4.3.4 Quit

Select this option to end your interaction with the dental pain program. Use of the program should always end with this option. Ending your interaction with the program in any other way risks both the loss of case data and damage to, or loss of, the program.

5. DENTAL PROGRAM TUTORIAL

In this section, we will "walk through" the process of entering a real dental case into the computer. It is assumed that you have read the first four chapters of the dental pain user's manual. If you have not, please do so before continuing. The instructions presented in this tutorial should help you to enter in a step-by-step fashion the dental case presented in the scenario. Use of this tutorial will assist you in becoming familiar with the dental pain program.

5.1 Dental Case Scenario

Imagine that a crewmember approaches you with a dental complaint:

A 23 year old male, TM3 reports with a chief complain of sore, bleeding gums, bad breath, and fever as well as difficulty eating.

Upon exam, the patient's gingival papilla are blunted and covered by a white/gray pseudomembrane. Gingiva is extremely tender and bleed very easily. Breath is foul, food debris abundant. The condition has progressively worsened over the last week. Present temperature is 100.4 degrees F and cervical lymphadenopathy is present. The patient says that this situation, but not as bad, occurred 1 year ago. At that time, he had his teeth cleaned and he improved. No nodes or fever were present on the previous occasion.

The patient has been working 10 days in a row, 10-12 hours a day. He smokes 2 packs/day, has 8 cups of coffee with cream and sugar, and only eats at Burger King. He brushes only 3 times a weeks because his gums bleed and he doesn't floss. He is prone to URI.

5.2 Starting the Program

In this tutorial, your entries into the computer are identified in **BOLD FACE**. To enter a case you must first start the program. The program can be installed on the hard drive or a floppy disk.

If the program is installed on the hard drive: Turn on the computer. At the prompt, type '**DENTAL**' and press the **return/enter** key.

If the program is installed on a on floppy disk: Turn on the computer. At the prompt, type the letter key associated with external disk drive. Insert the floppy disk containing the dental pain program into the external disk drive. Type "**DENTAL**" and press the **return/enter** key.

5.3 Entering a Case

Listed below are the 20 display pages you will encounter while entering the example dental case into the dental pain program. Your entries into the program are identified in **BOLD FACE**.

Monochrome or Color Display? (M/C) C

Screen 1: The program asks to specify the type of monitor. The 'C' to the right is the default choice. If you have a color monitor simply press **Return/Enter**. If you have a monochrome monitor type **'M'** and press **Return/Enter**.

Naval Submarine Medical Research Laboratory
Groton, Connecticut

Naval Dental Research Institute
Great Lakes, Illinois

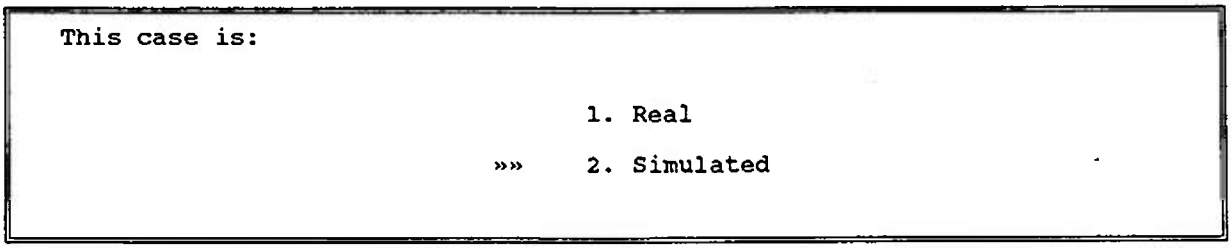
COMPUTER-ASSISTED DIAGNOSIS OF DENTAL EMERGENCIES

FOR INDEPENDENT DUTY HOSPITAL CORPSMEN

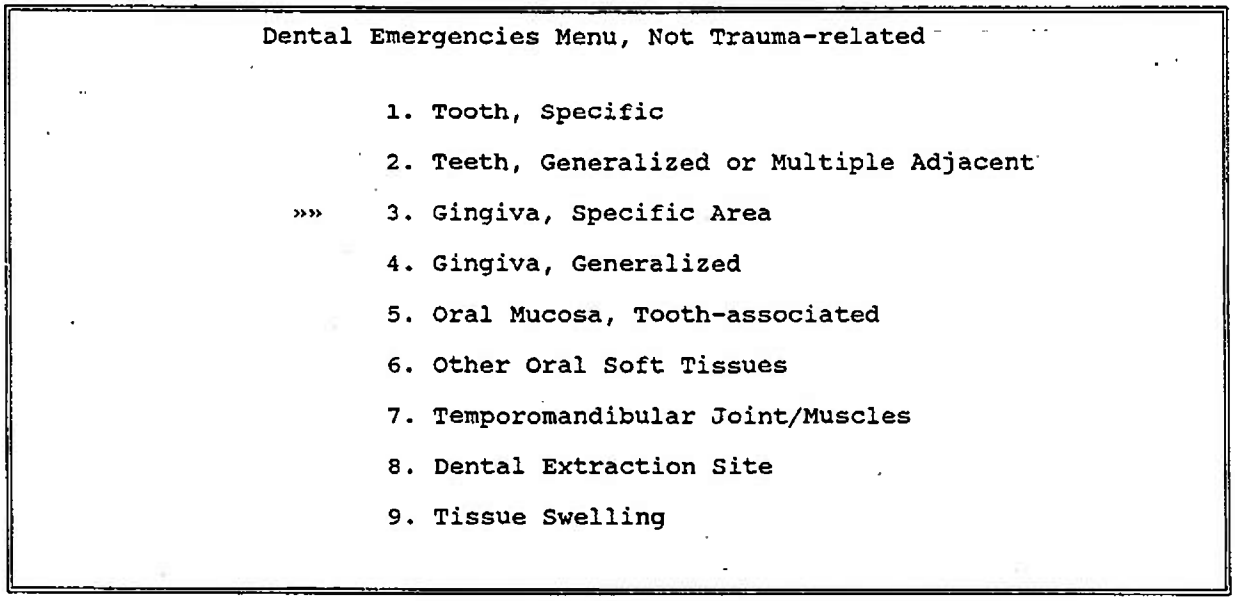
Version 3.0.
April 1989

Press RETURN to continue.

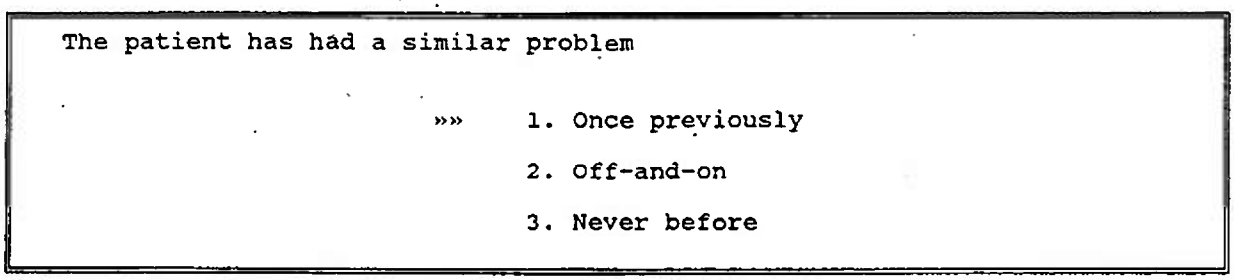
Screen 2: Read title page. Press **Return/Enter** to proceed to general instructions about the dental pain program. Because of space limitations the instructions are not displayed in this manual. Press **Return/Enter** to proceed through instructions.



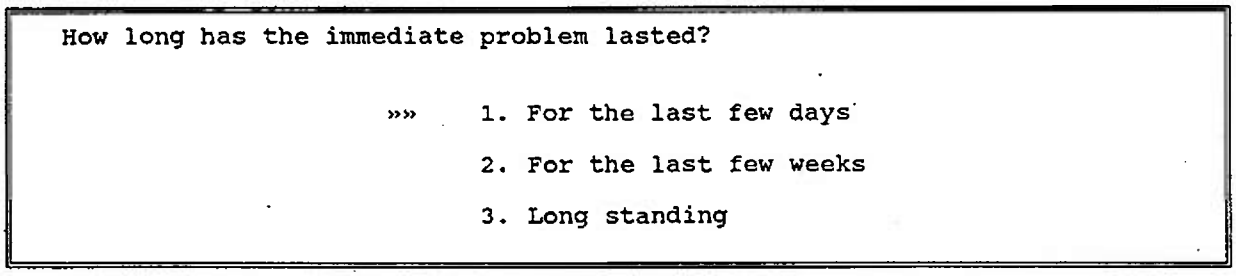
Screen 3: This case is simulated. Use the arrow keys to select 'Simulated'. Press the **Return/Enter** key.



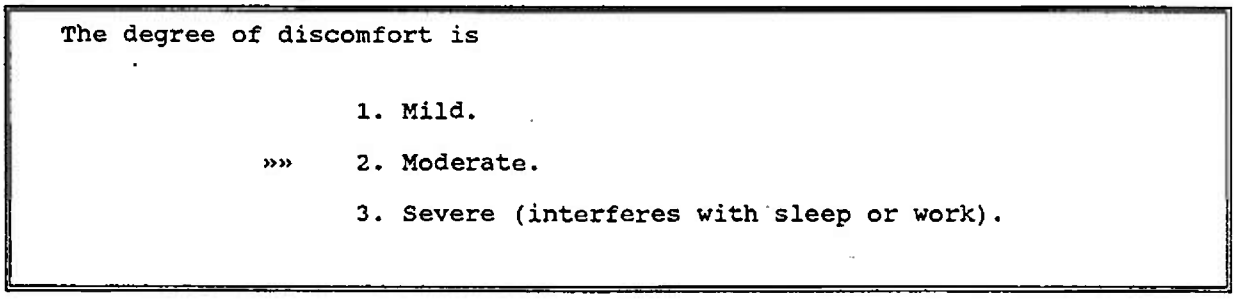
Screen 4: The patient's pain is non-trauma related. Use the arrow keys to select '1. Discomfort or Pain, Non- trauma Related'.



Screen 5: Use the arrow keys to select '3. Gingiva, Specific Area'. Press Return/Enter.



Screen 6: Select '1. Once previously'. Press Return/Enter.



Screen 7: Select '1. For the last few days'. Press Return/Enter.

Does the area of concern appear to be either a flap of inflamed tissue partially covering an erupting tooth or an area of tissue (not always grossly inflamed) surrounding an erupting tooth?

1. Yes

»» 2. No

Screen 8: Select '2. Moderate'. Press Return/Enter.

Aside from possible racial pigmentation, whichis a normal finding if present, what is the color of the gingival tissues (gums)?

1. Pink

2. Red

3. Pink with red gingival margins

»» 4. Either No. 2 or No. 3 above, but with areas having a gray-white membranous coating that can be easily removed

Screen 9: Select '2. No'. Press Return/Enter.

In the area of concern, do the gingival (gum) tissues bleed when probed or does the patient report bleeding when brushing?

»» 1. Yes

2. No

Screen 10: Select '4. Either No. 2 or No. 3 above, but with areas having a gray-white membranous coating that can be easily removed'. Press Return/Enter.

```
In the area of concern, do the gingival papillae appear

                    1. Scalloped and not swollen (normal)?
                    2. Swollen and enlarged?
               »»   3. Ulcerated or blunted?
```

Screen 11: Select '1. Yes'. Press **Return/Enter.**

```
Is an extremely foul odor present?

                         »»   1. Yes
                              2. No
```

Screen 12: Select '3. Ulcerated or blunted?' Press **Return/Enter.**

```
Does the patient have an elevated temperature, palpable lymph nodes
of the head and neck region, or malaise?

                         »»   1. Yes
                              2. No
```

Screen 13: Select '1. Yes'. Press **Return/Enter.**

Is a very prominent, but localized, swelling of the gingival or mucosal tissues present?

1. Yes

»» 2. No

Screen 14: Select '1. Yes'. Press Return/Enter.

Do the teeth feel tight or like something is caught between them?

1. Yes

»» 2. No

Screen 15: Select '2. No'. Press Return/Enter.

Does the patient relate a history of food being trapped or caught between the teeth in the area of concern?

1. Yes

»» 2. No

Screen 16: Select '2. No'. Press Return/Enter.

Does the patient have shallow, ragged, painful ulcers covered by a gray/white membrane and surrounded by a reddish halo?

1. Yes

»» 2. No

Screen 17: Select '2. No'. Press Return/Enter.

Corpsman's Diagnosis

Select the Most Likely Diagnosis(es)

- Localized Alveolar Osteitis (Dry Socket)
- Osseous Sequestrum
- Abscess/Infection/Cellulitis
- Periodontal Abscess
- Reversible Pulpitis
- Irreversible Pulpitis
- Acute Apical Abscess
- Acute Apical Periodontitis
- Carious Lesion (Decay)
- Dentin Hypersensitivity
- Maxillary Sinusitis
- Endodontic/Periodontic Combined Problem
- Defective Restoration
- Acute Herpetic Gingivostomatitis
- Pericoronitis/Erupting Tooth

»» • Necrotizing Ulcerative Gingivitis

- Acute Gingivitis
- Food Impaction

(Page 1 of 2)

Screen 18: Select '2. No'. Press Return/Enter.

Probable Diagnoses	Possible Diagnoses
»» • Necrotizing Ulcerative Gingivitis	NONE

For Treatment Recommendations, position then press RETURN.

Screen 19: Corpsman's Diagnosis Page. Use arrow keys to move the cursor to Necrotizing Ulcerative Gingivitis. Press Return/Enter. Press Esc to exit to Computer Generated Diagnosis Page.

Treatment Recommendations

Necrotizing Ulcerative Gingivitis -- Give the patient thorough oral hygiene instructions and have the patient demonstrate plaque removal to you daily if necessary. This is mandatory! The patient will bleed when brushing. Debride the patient's mouth initially using curettes or a toothbrush or wet cotton balls or combination of these. Start the patient on 3% hydrogen peroxide rinses 4-6 times a day for a week. If the patient has fever/lymphadenopathy/malaise then give penicillin V-K 500 mg q6h for 7-10 days if not otherwise contraindicated. Analgesics are helpful. The patient should promptly improve but needs close follow-up. The bleeding of the gingival tissues may continue until more definitive care can be provided. Refer the patient for a periodontal evaluation ASAP. MEDEVAC of the patient may be necessary.

Screen 20: Computer Generated Diagnosis is Necrotizing Ulcerative Gingivitis (NUG). Press **Return/Enter** to access treatment recommendation for NUG.

ACKNOWLEDGEMENTS

The original dental pain program was produced at the Naval Dental Research Institute, Great Lakes, IL.

APPENDIX A

Diagnostic Categories for Trauma and Non-Trauma Related Dental Pain

Abscess/Infection/Cellulitis

As used in this program, this is a catch-all category. With any of the three areas, many of the classic signs of an infection are usually present and may include any or all of the following: swelling, redness, pus formation, elevated temperature, and malaise. An abscess is a localized accumulation of pus and may vary in size. An abscess may develop into a cellulitis which is a diffuse, usually subcutaneous spreading of inflammation which may become life-threatening.

Acute Apical Abscess

An advanced exudative and profoundly symptomatic inflammatory response of the periapical connective tissues. It is caused by contaminants from the pulp canal that produce a steadily increasing amount of inflammatory exudate (edema) and later, pus. Radiographically the apical area of the tooth may appear normal. Pus often drains through the alveolar bone forming a clinically fluctuant swelling, often on the mucosa overlying the apex of the involved tooth. Some relief of pain is often experienced upon rupture or drainage of the abscess.

Acute Apical Periodontitis

The initial exudative and moderately symptomatic inflammatory reaction of the periapical connective tissues. It is usually caused by contaminants from the pulp canal which produce exudation in the periapical area, however, a milder form of acute apical periodontitis, unrelated to pulpal disease, can occur from occlusal trauma. There is no swelling but the tooth is tender to percussion. When caused by pulpal disease, this condition usually progresses to an acute apical abscess.

Acute Gingivitis

Acute inflammation of the gingiva characterized by red, painful, bleeding gingival tissues.

Acute Herpetic Gingivostomatitis

An acute viral disease characterized by multiple vesicle formation and gingival inflammation. The vesicles may form on most areas of the mouth, as opposed to aphthous ulcers (canker sores) which form on non-keratinized tissue and are usually single in number. The vesicles are not usually seen as they rupture early and form whitish ulcers, each surrounded by a reddish halo. In its primary form, the condition is often quite painful and the patient may complain of a sore mouth. The patient may have an elevated temperature, malaise, and lymph node involvement. Because of the sore

mouth, fluid intake needs to be maintained to avoid dehydration. In a recurrent form, small ulcers/sores are often found on the lateral areas of the palate, near the bicuspids and molars.

Carious Lesion (Decay)

A microbial disease of the calcified tissues of the teeth, characterized by demineralization of the inorganic portion and destruction of the organic substance of the tooth. Clinically, it varies in color from orange to brown but is always soft and can be penetrated by a sharp instrument such as a dental explorer. Untreated, a carious lesion can progress to involve the pulp of the tooth and lead to pulpitis, acute apical periodontitis, and acute apical abscess. Sensitivity to sweets/sugar may suggest a carious lesion.

Defective Restoration

Imperfections, fractures, open margins or other undesirable attributes in dental restorations (ex. fillings, crowns, etc.) which are conducive to the development of dental caries. This in turn may lead to pulpal death and endodontic problems. A dental explorer placed in the restoration/tooth interface may detect the softer carious tooth structure.

Dentin Hypersensitivity

Excessive sensitivity of dentin, which is the light yellowish calcific tissue underlying the cementum or enamel that forms the body of a tooth. Clinically, dentin hypersensitivity usually occurs near the gingival margin. Dentin is often exposed near the gingival margin from gingival recession or from toothbrush abrasion of the relatively thin enamel layer in this area. The sensitivity is usually to cold, but may be to touch and hot as well. The sensitivity does not linger after the stimulus is removed.

Displacement/Mobility of Tooth, Favorable Prognosis

As a result of trauma, the prognosis for a displaced or mobile tooth is favorable when only relatively minor displacement or mobility of the tooth exists, the tooth was otherwise healthy prior to the trauma, and no other compromising conditions exist such as an alveolar fracture.

Displacement/Mobility of Tooth, Guarded Prognosis

As a result of trauma, the prognosis for a displaced or mobile tooth is guarded when the tooth is extremely mobile or was not otherwise healthy before the trauma or an alveolar fracture is present.

Enamel Fracture

This condition occurs when the crown of the tooth has been traumatized and the damage is confined strictly to the enamel. Although the tooth may be sensitive, this condition is of relatively minor importance.

Endodontic/Periodontic Combined Problem

In this situation both periodontal and endodontic etiologies exists. In order for healing to occur both root canal treatment and periodontal therapy are necessary.

Food Impaction

Forceful wedging of food between the teeth. Gingival tissues in an area of food impaction are usually red and bleed easily, and may be painful. A foul odor may be present.

Fractured Alveolar Bone

A fracture of the alveolar process which may or may not have involve the alveolar socket. Commonly located in the anterior area, they can also affect other areas. The fracture line may be apical to the apices (ends) of the teeth, but in most cases involves the alveolar socket. In these cases associated dental injuries such as extrusive or lateral luxations and root fractures are common findings. Fractures of the alveolar process can usually be diagnosed by finding displacement and mobility of the fragment. Approximately 75% of teeth in the line of an alveolar fracture become devitalized and, if not extracted or treated with endodontics, can result in endodontically-related emergencies.

Fractured Crown, Large Pulp Exposure

A tooth that is fractured with its pulp exposed with a size greater than 1 mm in diameter is considered, for purposes of this program, to be a fractured crown with a large pulp exposure. A large pulp exposure cannot usually be treated to predictably to retain pulp vitality and endodontic treatment (root canal) is usually ultimately necessary.

Fractured Crown, Pulp Not Exposed

This condition occurs when the crown of a tooth has been fractured exposing the dentin but not the pulp. Depending on the extent of the fracture, the tooth may be quite sensitive. Prolonged exposure of the dentin may result in pulpal death depending in part on the proximity of the fracture line to the pulp.

Fractured Crown, Small Pulp Exposure

A tooth that is fractured with its pulp exposed with a size less than 1 mm in diameter is considered, for purposes of this program, to be a fractured crown with a small pulp exposure. When a small pulp exposure is properly treated, pulpal vitality may be retained.

Fractured Mandible

Mandibular fractures are classified into various types, depending on the location of the fracture and whether or not the fracture is simple,

compound, or comminuted. The incidence of fractures by sites is approximately as follows: angle 31%, condyle 18%, molar region 15%, mental region 14%, symphysis 8%, cuspid 7%, ramus 6% and coronoid process 1%.

Fractured Maxilla/Fractured Facial Bones

Maxillary/facial fractures are serious injuries because they involve important anatomical structures. The nasal cavity, maxillary antrum, orbit, and brain may be involved primarily by trauma or secondarily by infection. Cranial nerves, major blood vessels, vascular areas, thin bony walls, multiple muscular attachments, and specialized epithelia characterize this region in which injury can result in serious and life-threatening sequelae. There are multiple types of fractures that can occur in this area.

Internal Derangement of the Temporomandibular Joint

A broad category which includes any internal malrelationship of the temporomandibular joint, the articular disk, and associated structures. A malposed/diseased/degenerated articular disk may result in clicking, popping, or locking of the joint. Pain is usually in or around the joint and usually increases during mastication. This condition may be associated with myofascial pain/muscle spasms.

Irreversible Pulpitis

A condition of the pulp in which there are painful episodes which are spontaneous and continuous and often aggravated by heat or cold. The patient may have had a previous history of pain in the same tooth.

Localized Alveolar Osteitis (Dry Socket)

A breakdown or improper formation of the blot clot that normally forms in an extraction site and which is necessary for healing. It most commonly develops on the third or fourth day after extraction and in conjunction with the extraction of a lower wisdom tooth. It is characterized by continuous pain in the general extraction site area which may radiate to the ear. A necrotic odor is frequently present. Irrigation with sterile saline and eugenol/iodoform gauze dressings are used to treat the condition.

Maxillary Sinusitis

Inflammation of the maxillary sinus, the bony cavity in the body of the maxilla, superior to the alveolar process, lateral to the nasal cavity, and communicating with the middle meatus of the nose. Symptoms include percussion sensitivity of the maxillary bicuspid and molar teeth, often generalized rather than to a specific tooth. The pain usually increases when the position of the head is rapidly changed, such as lowering it. The patient usually reports having a recent cold or sinus problem.

Myofascial Pain/Muscle Spasms

Discomfort or pain associated with the muscles of mastication and related to the temporomandibular joint. For treatment purposes, muscles may be viewed as being in a spastic state. This condition is often related to stress, habits, or occlusal malrelationships and patients need to be carefully questioned and examined. Parafunctional habits may include grinding or clenching of the teeth or gum chewing; pain related to night grinding is often more intense in the morning after waking up. Treatment is directed at reducing stress, physical therapy, and correcting habits. The occlusion can be addressed by a dentist. Bite splints are prosthetic devices often used by dentists to, among other things, de-program the muscles and help them "relax." This condition may be associated with an internal derangement of the joint(s).

Necrotizing Ulcerative Gingivitis

An acute gingival infection characterized by an extremely foul oral odor; bleeding, painful gingiva; development of a white, easily removable pseudomembrane over the gingival tissues; and blunting of the interdental papillae (the tissue between the teeth). Malaise, elevated temperature, and lymph node involvement may be present. This condition is also called trenchmouth, Vincent's infection, and NUG and ANUG.

Neurologic Injury

Within the context of this program, after trauma to the head, the following usually indicate a neurologic injury: 1) loss of consciousness, 2) vomiting, or 3) amnesia.

Occlusal Trauma

An abnormal occlusal force on a tooth, often resulting from a malocclusion or an improper (ex. "high") restoration. The involved tooth/teeth often feel sore and have an increased mobility. When the supporting structures of the teeth have been lost, for example bone and attachment loss from periodontal disease, then even normal occlusal forces acting on a compromised periodontium may act with traumatic results.

Osseous Sequestrum

During extraction of a tooth, small fragments of bone may be fractured from the socket. These pieces of bone may become non-vital and work their way to the surface of the tissue one to two months after the extraction until they are sequestered.

Pericoronitis/Erupting Tooth

Pericoronitis is classically an acute, painful inflammation of the tissues overlying a partially erupted lower third molar (wisdom tooth). The third molar may only appear on radiographs. Typical symptoms may include lymphadenopathy, trismus, pain in the region of the third molar, malaise,

and elevated temperature. These symptoms may vary from mild to severe pain. The patient may develop a cellulitis capable of producing difficulty in swallowing, and the patient can have extreme tenderness to palpation extraorally and intraorally and edema visible in the submandibular and pharyngeal regions. Untreated, respiratory compromise and/or progression of the infection to the mediastinum may result.

Periodontal Abscess

A localized area of pus formation originating from inflammation in the periodontal pocket or space and manifesting as a swelling on the gingival (gum) tissues. Periodontal abscesses rarely progress to a cellulitis and, although they may be uncomfortable, are somewhat self-limiting.

Reversible Pulpitis

A condition of the pulp in which there are painful episodes of short duration initiated by an external stimulus (ex. touch, cold, heat). A history of recent dental procedures (ex. new filling, root planing), a faulty restoration, or cervical erosion may help establish this as a possible diagnosis.

Root Fracture

Total or partial separation of an otherwise intact root. Fractures can be obvious or hairline and can be in horizontal or vertical directions. Although it depends on the direction, location on the root, and the extent of the fracture, the prognosis for teeth with root fractures is usually extremely guarded. Extraction of the teeth is often the ultimate sequelae.

Total Avulsion of Tooth, Good Candidate for Replantation

A tooth that is a good candidate for replantation is one that 1) was otherwise healthy before being avulsed; 2) has been avulsed for less than 3 hours; 3) is generally intact; and 4) has an intact socket into which to reimplant the tooth. It is best if the tooth is not allowed to dehydrate before reimplanting.

Total Avulsion of Tooth, Poor Candidate for Replantation

A tooth that is a poor candidate for replantation is one in which any of the following conditions have been met: 1) the tooth has been avulsed for longer than 3 hours; 2) the tooth is not intact; or 3) the socket to which the tooth should be reimplanted is not intact. In some cases, if the tooth was not healthy before being avulsed or was allowed to dehydrate, it is not usually a good candidate for replantation.

APPENDIX B

Definition of Dental Terminology

Abscess:	Localized accumulation of purulent material or pus, usually acute
Acute:	Sharp; having a short and relatively severe course
Alveolar Bone:	The bone of the mandible or maxilla that supports teeth
Anomaly:	Deviation from normal
Apical:	Referring to the apex of a tooth; end of the tooth opposite the crown
Atrophy:	A wasting away or diminution in the size of the tissue/organ
Avulsed:	Separated or detached forcibly
Blunted:	Flattened with loss of scalloped (pointed) shape
Buccal:	Pertaining to the cheeks or the cheek side
Bulla:	A large blister or cutaneous vesicle filled with serous fluid
Cellulitis:	Diffuse, usually subcutaneous spreading inflammation of connective tissue
Chronic:	Long-standing; not acute
Cleft:	A longitudinal opening or fissure
Crepitus:	Cracking or grating sound
Cyst:	A sac-like structure filled with a liquid or semisolid substance
Dentin:	The light-yellowish tooth substance that surrounds the pulp and is covered by enamel
Desquamation:	The shedding of epithelial elements/cells in scales or sheets (surface layers of tissue)
Diffuse:	Not definitely limited or localized
Diplopia:	Double vision

Discrete: Separate or distinct

Enamel: The white, hard substance that covers and protects the dentin of the crowns of teeth

Endodontic: Pertaining to the pulp of the tooth

Enophthalmia: Retraction of the eye into the orbit

Eroded: Worn away; destroyed over time

Exophytic: Outwardly growing

Exophthalmia: Abnormal protrusion of the eye

Fissured: Having clefts or grooves

Fluctuant: Having a wave-like motion or the sensation of being fluid-filled

Generalized: Throughout; not localized

Gingiva: Gum tissue; keratinized mucosal tissue that surrounds the necks of the teeth

Glossodynia: Pain in the tongue

Hemorrhagic: Pertaining to or characterized by bleeding

Hyperplastic: Pertaining to an abnormal multiplication or increase in the number of normal cells in normal arrangement in a tissue

Infraorbital Rim: Bony rim palpable just below the eye

Intercanthal Distance: Distance between the medial corners of the eye

Irreversible Pulpitis: A state of pulpal inflammation in which the pulp does not have the potential to return to a state of health

Keratotic: Having a horny/keratinized/somewhat fibrotic nature; usually whitish in appearance; cannot be rubbed-off

Lobulated: Made up of or divided into lobules

Localized: Restricted to a limited region; not generalized

Lingual: Pertaining to the tongue or tongue side

Macroglossia: Enlarged tongue

Malaise: Generalized body uneasiness, debility, or discomfort

Mandibular: Pertaining to the lower jaw or mandible

Maxillary: Pertaining to the upper jaw or maxilla

Membranous: Pertaining to a membrane; pertaining to a thin layer of tissue which covers a surface

Microglossia: Undersized tongue

Mobility: (Dental) pertaining to an increased buccal/lingual (sideways) or vertical movement of the teeth

Mucosa: Mucous membrane; (oral) the tissue lining inside the mouth

Muscles of Mastication: Primarily the masseter, temporalis, medial pterygoid and lateral pterygoid muscles

Myofacial: Referring to muscles of the face

Necrotic/Necrotizing: Having characteristics of necrosis or non-vitality

Nodules: A small boss or node which is solid and detectable by touch

Occlusion/Occlusal Surface: Pertaining to the bite or interdigitation of the teeth; the biting surface

Papillary: Pertaining to or resembling small nipple- shaped projections or elevations

Parotid-area: Pertaining to the area of the parotid salivary gland; anterior and inferior to the ear

Periodontal/Periodontic: Pertaining to the supporting structures of teeth (i.E. Gingiva, bone, periodontal ligament, and cementum)

Periodontitis: Inflammation of the supporting structures of the teeth

Preauricular: In front of the ear

Probing Depth: Depth of a periodontal pocket/sulcus measured in mm from the gingival margin to the base of the pocket/sulcus

Pulp: The vascular, nervous, and connective tissue contained within the pulp chamber in the center of the tooth

Pulpitis: Inflammation of the pulp

Purulence: The condition of having or containing pus

Racial Pigmentation: (Dental) normal pigmentation of the mucosa/gingiva; characterized by a diffuse generalized appearance; more commonly found in dark-skinned persons

Restoration: A dental filling

Reversible Pulpitis: A state of pulpal inflammation in which the pulp has the potential to return to a state of health

Sequestrum: That which is sequestered or given off; often refers to a small fragment of non-vital bone

Sinusitis: Inflammation of a sinus or sinuses

Spontaneous: Occurring for no particular reason or stimulus

Supernumerary: Extra; above the normal number

Temporomandibular Joint (TMJ): The joint(s) which connects the mandible to the temporal bone

Ulcers/Ulcerated: A loss of substance on a cutaneous or mucous surface causing gradual disintegration and necrosis of the tissues

Vesicular: Pertaining to small blisters or serous-filled elevations

Zygomatic arch: The bony arch formed by zygomatic bone (malar/cheek bone)

APPENDIX C

Treatment Recommendations for Trauma and Non-Trauma Related Dental Conditions

Abscess/Infection/Cellulitis

Maintain vital signs/airway. Correct the cause if possible. Establish drainage if purulence is suggested and if feasible, considering anatomic structures and individual abilities. Perform culture and sensitivity tests if possible. Administer antibiotics (penicillin is the drug of choice if not otherwise contraindicated). Use sedatives/analgesics cautiously as they can compromise respirations. Maintain hydration and nutrition. If a dental etiology is suspected review recommendations for periodontal and periapical abscesses. If the patient does not respond MEDEVAC in prone/lateral prone position to help maintain the airway. These patients can become very sick; do not hesitate to MEDEVAC.

Acute Apical Abscess

If caries are present, anesthetize and isolate the tooth with 2 x 2 gauze. Remove caries and pulp contents with spoon excavators to establish drainage through the crown of the tooth. Administer antibiotics (penicillin is the drug of choice if not otherwise contraindicated). If a fluctuant swelling is present apply topical anesthetic and I & D with a No. 12 blade by using a small (2-3 mm) shallow incision. Use hot saline rinses and analgesics. If you are unable to remove the caries/restoration and, therefore, unable to establish drainage through the tooth then only I & D the abscess. Refer the patient for definitive endodontic evaluation ASAP. MEDEVAC of the patient may be necessary if the situation does not respond.

Acute Apical Periodontitis

If you are able, vitality tests should be performed. If the tooth is vital then check the occlusion and relieve if able. If the tooth is non-vital and has caries, anesthetize and isolate the tooth with 2 x 2 gauze. Remove the caries with spoon excavators and expose the pulp. Place a cotton pellet lightly moistened with formocresol to the deepest part of the cavity. Mix a zinc oxide and eugenol restoration and place it over the cotton pellet. If the tooth is non-vital and the caries cannot be removed then use antibiotics and analgesics and monitor closely. This situation can progress to an acute apical abscess. Refer for endodontic evaluation ASAP. MEDEVAC of the patient may be necessary.

Acute Gingivitis

Give the patient thorough oral hygiene instructions and have the patient demonstrate brushing and flossing to you daily if necessary. Hot saline rinses and analgesics will also help. Under conditions of strict plaque removal, the acute stage should resolve within 1-2 weeks. If not, check the Soft Tissue Lesions Section of this program for other

possibilities such as a blood dyscrasia or acute herpetic gingivostomatitis or allergy or some other systemic condition. Antibiotics are not usually indicated. Refer the patient for a periodontal evaluation ASAP. MEDEVAC is not usually necessary.

Acute Herpetic Gingivostomatitis

Treatment is generally palliative. As a primary condition vesicles and gray/white ulcers surrounded by a red halo can be found throughout the mouth. Adjacent gingival tissues are usually inflamed. Oral hygiene instructions should be given. Insure an adequate fluid intake by the patient. Analgesics are recommended. In severe cases rinses of viscous lidocaine or diphenhydramine elixir can be used. Antibiotics are only necessary if a secondary bacterial infection is suspected. The condition should resolve within 2 weeks. A more innocuous recurrent form of this condition may occur and it is commonly seen on lateral areas of the palate. The classic ulcers are not usually seen in the recurrent form. Rather you might see small vesicles or eroded areas. This condition is treated similarly to the primary condition although it is far less severe. If only one or two painful classic ulcers are noted on the oral mucosa then a diagnosis of apthous ulcer(s) should be considered. There generally will not be any systemic involvement (i.e. fever or lymph nodes, etc.). Aphthous uclers resolve spontaneously in 1-2 weeks.

Carious Lesion (Decay)

If the tooth is vital anesthetize and isolate the tooth with 2 x 2 gauze. Remove the caries with a spoon excavator until hard tooth structure is encountered. If a small pulp exposure (<1 mm) is present, place a calcium hydroxide base. If a large exposure is present, remove as much pulp as possible and place a cotton pellet lightly moistened with formocresol over the pulp exposure. Mix and place a zinc oxide and eugenol restoration over the cotton pellet or hard tooth structure if no exposure was present. If the tooth is non-vital then follow recommendations for irreversible pulpitis. If you are unable to remove the caries then use analgesics. Symptomatic carious lesions usually imply that, at the very least, a pulpitis is present. This condition may progress to apical periodontitis or an apical abscess. Monitor closely and refer for definitive care ASAP.

Defective Restoration

If caries are present, review treatment recommendations for carious lesions. If the restoration has become displaced or fractured or a part has been lost then protect the dentin if it is exposed to make it less responsive to painful stimuli. Isolate the tooth with 2 x 2 gauze. If a pulp exposure exists, review the treatment recommendations for small (< 1 mm) or large (> 1 mm) pulp exposures. If no pulp exposure is present then mix and place a zinc oxide and eugenol restoration. If this is not possible then use analgesics and observe closely. Local anesthesia is not usually required. Refer the patient for definitive dental care ASAP. MEDEVAC of the patient may be necessary.

Dentin Hypersensitivity

Treatment consists of removal of the pain stimulus and treating the dentin to make it less responsive to the stimulus. Counsel the patient to avoid hot and cold foods or liquids in the area. The patient should temporarily avoid highly acidic foods such as oranges or pineapples as these may aggravate the condition. Recommend a desensitizing toothpaste to the patient and follow the manufacturer's instructions. If this is not available have the patient use a bland toothpaste and avoid super-whitening brands. Refer for definitive dental treatment when possible. Mild analgesics such as aspirin or acetaminophen may help.

Displacement/Mobility of Tooth, Favorable Prognosis

Local anesthesia and analgesics may be needed. Debride and suture any lacerations. Gently reposition the tooth to its original position using the patient's occlusion, adjacent teeth, and input from the patient to guide you. Stabilize the tooth in its original position for 1-2 weeks with sutures/light wire/floss/or fishline. Check to insure that the patient does not occlude heavily on the traumatized tooth. If so either reposition the tooth or adjust the occlusion if you are able. The patient will need dental evaluation and follow-up. Observe closely and refer when practical. Monitor for infection. MEDEVAC may be necessary.

Displacement/Mobility of Tooth, Guarded Prognosis

Local anesthesia and analgesics are usually indicated. If the tooth has a loose fragment related to a fracture line then attempt to remove the fragment. If the remaining tooth structure is extremely mobile attempt removal of the tooth. If not then cover the patient with antibiotics (penicillin if not otherwise contraindicated) and check regularly. Debride and suture any lacerations. MEDEVAC may be necessary if an acute phase develops which cannot be resolved. Otherwise, refer for dental evaluation and treatment at the earliest opportunity.

Enamel Fracture

Local anesthesia and analgesics are not usually necessary. Check the location of the fracture or sharp edge by sight/feel/and conversation with

the patient. Remove any mobile tooth fragments if you are able. Smooth any sharp edges with wet/dry 220 aluminum oxide sandpaper or a small round-end metal file. Smooth the sharp edges until they feel smooth to your finger and to the patient's tongue. Refer the patient when practical for follow-up dental evaluation and treatment. MEDEVAC is usually not necessary.

Endodontic/Periodontic Combined Problem

This exists when there are both endodontic and periodontal etiologies for the abscess. Review the treatment recommendations for both the periodontal abscess and the acute apical (endodontic) abscess. The endodontic component of the problem is the more likely source of the discomfort and should usually be treated first. Treat the problem as if it were an acute apical abscess with the exception of additionally trying to curette the periodontal pockets to remove any calculus or debris. Use antibiotics (penicillin is the drug of choice if not otherwise contraindicated) and analgesics. Monitor closely. MEDEVAC of the patient may be necessary. Refer for endodontic and periodontic evaluation ASAP.

Food Impaction

Using a periodontal curette or probe or explorer, attempt to remove the impacted food debris. It is usually caught between the teeth and can be difficult to notice because of the facial and lingual gingival papillae. Once the debris is removed give the patient oral hygiene instructions with emphasis on flossing. Have the patient rinse with hot saline 4-6 times a day for a week or so. If all food debris is not removed there is the potential to develop a periodontal abscess or localized infection. Have the patient avoid chewing fibrous foods/meats until the acute condition is resolved. Refer the patient for definitive dental care ASAP. MEDEVAC is not usually necessary.

Fractured Alveolar Bone

Use local anesthesia/analgesics/antibiotics (usually penicillin if not otherwise contraindicated). Debride the area of any small loose bone chips or spicules. Do not remove larger pieces of alveolar bone that are intimately covered with soft tissue. Gently pinch or mold the fractured alveolar bone through the gingival/mucosal tissues. Suture any lacerations and attempt to stabilize the bone by splinting teeth in the mobile segment with adjacent teeth using floss/light wire/suture/or fishline. Monitor closely for possible infection. MEDEVAC may be necessary.

Fractured Crown, Large Pulp Exposure

Use local anesthesia/analgesics. Remove any mobile tooth fragments if present and if you are able. Remove approximately 2 mm (depth) of pulp tissue with a spoon excavator. Good anesthesia is desirable. Lightly moisten a cotton pellet with eugenol or formocresol and gently place over the remaining pulp stump. Mix and place a zinc oxide and eugenol restoration. Check the occlusion. Remove any sharp edges on the tooth with wet/dry 220 aluminum oxide sandpaper or a small round-end metal file.

Observe the patient closely as an apical abscess or acute apical periodontitis may develop. Refer the patient for an endodontic evaluation and definitive care as soon as practical. MEDEVAC may be necessary.

Fractured Crown, Pulp Not Exposed

Local anesthesia and analgesics may be necessary. Remove any mobile tooth fragments if you are able. Isolate the tooth with 2 x 2 gauze and mix and place a calcium hydroxide base to cover the exposed dentin. If you are able, apply a resin temporary restoration as per your IDT Syllabus. If you are unable then paint two layers of cavity varnish over the calcium hydroxide base (or dentin alone if a base cannot be placed). The base may be difficult to retain and may need frequent replacement. Smooth any sharp edges with 220 wet/dry aluminum oxide sandpaper or a small round-end metal file. Monitor the patient closely for development of a pulpitis. Refer the patient for definitive care when able. MEDEVAC is usually not necessary.

Fractured Crown, Small Pulp Exposure

Use local anesthesia/analgesics. Remove any mobile tooth fragments if present and if you are able. Isolate the tooth with 2 x 2 gauze and place a calcium hydroxide base over the pulp and adjacent dentin. If you are able apply a resin temporary restoration. If unable,mix and place a zinc oxide and eugenol restoration to cover the calcium hydroxide base. If the restoration cannot be placed nor retained observe the area closely. The patient may develop irreversible pulpitis. Smooth any sharp edges on the tooth with wet/dry 220 aluminum oxide sandpaper or a small round-end metal file. Refer the patient for endodontic evaluation and definitive care when able. MEDEVAC may be necessary.

Fractured Facial Bones

Maintain the airway and control bleeding. Support vital signs. Use analgesics/antibiotics (usually penicillin unless otherwise contraindicated). Debride and irrigate any lacerations. Loosely reapproximate the wound edges with tacking sutures but do not attempt definitive soft tissue closure if the laceration coexists with facial fractures. Close through-and- through lacerations with a watertight closure of the oral mucosa followed by a layered closure to the skin. Evaluate ocular function and orbital/periorbital trauma. Check for paresthesias in infra- and supraorbital regions. MEDEVAC the patient in a head-up or lateral prone position.

Fractured Mandible

Maintain airway function and control bleeding. Support the patient's vital signs. Use analgesics/antibiotics (usually penicillin if not otherwise contraindicated. Debride and irrigate any lacerations. Loosely approximate the wound edges with tacking sutures but do not attempt definitive soft tissue closure if the laceration coexists with facial fractures. Close through-and-through lacerations with a watertight closure of the oral mucosa followed by a layered closure to the skin. Improper use

of external immobilization bandages is dangerous and can further embarrass the airway. MEDEVAC the patient as soon as possible.

Fractured Maxilla

Maintain airway and control bleeding (temporary nasal packing may be needed). Support the patient's vital signs. Use analgesics/antibiotics (usually penicillin unless otherwise contraindicated). Debride and irrigate any lacerations. Loosely reapproximate the wound edges with tacking sutures but do not attempt definitive soft tissue closure if the laceration coexists with facial fractures. Close through-and-through lacerations with a watertight closure of the oral mucosal followed by a layered closure to the skin. The improper use of external immobilization bandages is dangerous and can further embarrass the airway. MEDEVAC the patient in a head-up or lateral prone position.

Internal Derangement of the TMJ

If you are able take a screening radiograph to rule out obvious pathosis. Immediate treatment consists of: 1) analgesics (aspirin/acetaminophen/ibuprofen); 2) soft diet (if the patient feels pressure in his joint when eating the diet is probably not soft enough); 3) hot moist packs to the joint area 4-6 times a day; 4) have the patient limit the range of motion of their mandible (do not have the patient open more than absolutely necessary when speaking/eating/yawning); 5) eliminate or reduce any aggravating habits such as chewing gum/clenching/bruxism; 6) counsel patient to decrease stress; and 7) use muscle relaxants (ex. diazepam PO). Refer the patient for dental evaluation when practical. MEDEVAC is usually not necessary.

Irreversible Pulpitis

If the tooth has caries, anesthetize and isolate the tooth with 2 x 2 gauze. Remove the caries until the pulp is exposed 1 mm or more then place a cotton pellet which has been lightly moistened with formocresol to the deepest part of the cavity. Mix a zinc oxide and eugenol restoration and place it to cover the cotton pellet. Use analgesics. Situation should improve after 3-6 hours. If not repeat above procedures and try to remove more caries or pulp tissue. If unable use analgesics and arrange for definitive care ASAP. Antibiotics are usually not needed. MEDEVAC of the patient may be necessary. Refer the patient for endodontic evaluation ASAP.

Localized Alveolar Osteitis

Irrigate the socket with sterile saline. The extraction site should then be packed with a single 2 inch piece of 1/8 inch iodoform gauze to which a drop of eugenol has been added. Gently insert the gauze to the full depth of the site. Pack loosely. A dramatic decrease in symptoms should occur within 10 minutes. Replace eugenol/gauze pack every day for about a week. Remove the pack permanently after 2 weeks. Hot saline rinses and analgesics may provide additional relief during the 2 week treatment period.

Maxillary Sinusitis

To corroborate the diagnosis take sinus series radiographs if you are able and palpate and percuss the sinus areas for sensitivity. The patient may complain of frontal headache pain or a sensation of supererupted dentition. Question the patient further about previous colds or sinus problems. A seropurluent or mucopurulent exudate may be present. Place the patient on decongestants. Place the patient on antibiotics if an exudate or fever or lymphadenopathy are evident (ampicillin is the drug of choice if not otherwise contraindicated). Monitor the patient closely. If radiographs reveal other pathological conditions, follow-up is required. MEDEVAC may be necessary if the condition is unresponsive.

Endodontic/Periodontic Combined Problem

This exists when there are both endodontic and periodontal etiologies for the abscess. Review the treatment recommendations for both the periodontal abscess and the acute apical (endodontic) abscess. The endodontic component of the problem is the more likely source of the discomfort and should usually be treated first. Treat the problem as if it were an acute apical abscess with the exception of additionally trying to curette the periodontal pockets to remove any calculus or debris. Use antibiotics (penicillin is the drug of choice if not otherwise contraindicated) and analgesics. Monitor closely. MEDEVAC of the patient may be necessary. Refer for endodontic and periodontic evaluation ASAP.

Myofascial Pain/Muscle Spasms

Immediate care consists of: 1) analgesics asprin/acetaminophen/ ibuprofen); 2) soft diet or liquid diet (if the patient has difficulty opening); 3) hot moist packs 4-6 times a day applied to the muscles of mastication (primarily masseter/temporomandibular joint/temporal areas); and 4) muscle relaxants (ex. diazepam PO). If the patient has severe trismus consider IM diazepam 5-15 mg. Eliminate or reduce any aggravating habits such as gum chewing/clenching/bruxism. Counsel the patient to reduce stress and anxiety which are often associated with the problem. Refer the patient for definitive dental evaluation when practical. MEDEVAC is not usually necessary.

Necrotizing Ulcerative Gingivitis

Give the patient thorough oral hygiene instructions and have the patient demonstrate plaque removal to you daily if necessary. This is mandatory! The patient will bleed when brushing. Debride the patient's mouth initially using curettes or a toothbrush or wet cotton balls or combination of these. Start the patient on 3% hydrogen peroxide rinses 4-6 times a day for a week. If the patient has fever/lymphadenopathy/malaise then give penicillin V-K 500 mg q6h for 7-10 days if not otherwise contraindicated. Analgesics are helpful. The patient should promptly improve but needs close follow-up. The bleeding of the gingival tissues may continue until more definitive care can be provided. Refer the patient for a periodontal evaluation ASAP. MEDEVAC of the patient may be necessary.

Neurologic Injury

Maintain the airway and control bleeding. Support vital signs. Perform neurologic examination and assess the level of consciousness. Assess the posture and movements and reflexes. Evaluate eye movements and pupils. Evaluate the gross focal neurological deficit. Determine the cause and time of injury and whether there are any associated injuries/shock/hypoxemia/or other medical complications. MEDEVAC is usually indicated.

Occlusal Trauma

This can occur from excessive force placed on teeth and is usually from a "high" restoration or bruxism or occlusal discrepancies. If the teeth hurt primarily in the morning then suspect nocturnal bruxism and review the treatment recomendations for myofacial pain. Determine if there are factitious or parafunctional habits that contribute to the problem. Treatment consists of: 1) eliminating or reducing aggravating habits (counsel the patient to reduce stress which often predisposes to bruxism); 2) adjusting the occlusion if able (ex. a restoration that is too "high"); and 3) having the patient avoid masticating in the affected area if possible. Refer the patient for definitive dental care when practical. MEDEVAC is not usually necessary.

Osseous Sequestrum

Treatment is generally palliative until such time as the sequestrum can be removed atraumatically with instruments or is exfoliated on its own. Hot saline rinses with analgesics and avoidance of the area by the patient when eating will help. If the sequestrum is not exposed, a few drops of local anesthetic can be deposited in the area and an attempt can be made to crush the spicule through the tissue using a blunt instrument. Observe the area closely and monitor for possible infection. A usually short-lived soft tissue defect may develop. Antibiotics are not usually indicated.

Pericoronitis/Erupting Tooth

Have the patient rinse with hot saline 4-6 times a day for a week or so. If an inflamed flap of tissue is present (pericoronitis) then debride the area under flap with a periodontal curette and follow with daily irrigation using sterile saline and a blunt irrigation needle. Pericoronitis can be a serious problem and antibiotics should be considered early in treatment. If the patient has fever/chills/lymphadenopathy/malaise, definitely give antibiotics, usually penicillin IV (8 million units per day) if not otherwise contraindicated. If the patient does not stabilize within 12-24 hours then MEDEVAC. Use analgesics as needed. Monitor and observe closely. For an erupting tooth the situation is usually self-limiting if an infection or severly inflamed tissue is not present. Treat this condition with analgesics. Refer the patient for an oral surgery evaluation ASAP.

Periodontal Abscess

Treatment consists primarily of establishing drainage through the gingival sulcus, if possible, using a periodontal curette or probe. If this is not possible, conservative I & D can be attempted by applying topical anesthetic and making a small (2-3 mm) shallow incision at the height of the fluctuant swelling. After the incision is made, explore the abscess area for purulence using a blunt instrument. Avoid surgical I & D on the lingual surfaces of the lower teeth as there are many important anatomical considerations. Hot saline rinses and analgesics will help. Antibiotics are not usually indicated. Refer the patient for a periodontal consult at the earliest convenience.

Reversible Pulpitis

Treatment consists of removal of the pain stimulus and/or protection of the tooth from the stimulus. In this case the stimulus may be transient thermal sensitivity. Sometimes only counseling is needed. Local anesthesia/analgesics may be necessary. If caries are present, anesthetize the area and isolate the tooth with 2 x 2 gauze and remove the caries until either discomfort is felt or hard tooth structure is encountered. Mix and place a zinc oxide and eugenol restoration. If a restoration cannot be placed, monitor the tooth for development of irreversible pulpitis. Antibiotics are not necessary. Refer the patient for definitive dental treatment at the earliest convenience.

Root Fracture

Use local anesthesia and analgesics. Isolate the tooth with 2 x 2 gauze. If part of the tooth is extremely mobile then attempt its removal. If the tooth itself is extremely mobile consider its removal. If not, attempt to cover any exposed pulp tissue with a calcium hydroxide base followed by a zinc oxide and eugenol restoration. Place the patient on antibiotics (usually penicillin if not otherwise contraindicated). If a base or restoration cannot be placed then observe the patient closely as an apical abscess/apical periodontitis may develop. A periodontal abscess can also develop. MEDEVAC may be necessary. Refer for dental evaluation and treatment when able.

Total Avulsion of Tooth, Good Candidate for Replantation

Ideally the tooth should be reimplanted immediately after avulsion. Use sterile saline to rinse any debris from the tooth then insert the tooth to its original position. If there is a time delay while awaiting replantation then store the tooth in saline or milk. Gently rinse the debris from the tooth with sterile saline. Preserve as much of the tissue on the tooth as possible. Remove any blood clots/foreign bodies/bone fragments from the socket. Local anesthesia is usually required if a time delay has occurred. Reposition the tooth in the socket with adequate pressure to reseat completely. Stabilize the tooth for 1-2 weeks using sutures/floss/light wire/fishline/or dental compound. Give the patient a tetanous booster and antibiotics (penicillin if not otherwise

contraindicated) and refer for for an endodontic evaluation and definitive care when able. MEDEVAC may be necessary.

Total Avulsion of Tooth, Poor Candidate for Replantation

Inspect the tooth to determine if tooth fragments remain in the tooth socket. If so then anesthetize and attempt retrieval of the fragments. If you are unable to retrieve fragments, give antibiotics. Remove obvious small bone chips except any relatively large areas of cortical plate which remain intimately covered with soft tissue. Leave these intact and attempt to reposition them if necessary. Suture any lacerations and have the patient close on a few 2 x 2 gauze squares for 30 minutes. Use analgesics. Check adjacent teeth for trauma or fractures. Antibiotics are not usually necessary. Refer the patient for definitive dental care as soon as practical. If the tooth was avulsed cleanly then MEDEVAC will probably not be necessary.

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19. ABSTRACT (Continue on reverse if necessary and identify by block number)

At sea, the Independent Duty Corpsman (8402) is responsible for the diagnosis and management of illnesses. He must decide whether to treat the patient on board the ship, or, if necessary, make recommendations regarding the evacuation of the patient. The corpsman's laboratory facilities are limited, and, in most instances, he is unable to communicate with shore-based medical facilities.

A computer assisted system to provide medical diagnostic information for corpsmen (MEDIC) has been developed at the Naval Submarine Medical Research Laboratory (NSMRL), Groton, CT. The purpose of MEDIC is to assist th corpsman in the diagnosis, triage, and management of patients who present at sea. When completed, the system will consist of programs for acute abdominal pain, acute chest pain, dental complaints, psychiatric disorders, and trauma. The computer programs are designed for use on an IBM PC or compatible computer.

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19 CONT'D

This manual reports on the computer assisted program for the management of acute dental pain. The program is rule based, designed for use with trauma and non-trauma related dental pain and also provides a differential diagnosis of soft tissue lesions.

This report is a manual designed to train the independent duty corpsman in the use of the dental pain program. It is written for the person with little or no prior experience with computers. The manual describes the hardware and software needed to run the computer program and discusses in detail each of the dental program modules. After reading the manual, the user should be able to use the program without the need for supplementary training.